A RADIANT FOREST:
REPORTED MYSTERY, HAZARD SIMULATION AND THE MODERATED SUBLIME

by

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Abstract

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This dissertation investigates a series of textual and landscape strategies revolving around core issues of intention, naturalness, and disclosure. The following chapters present a range of exemplary simulation methods and texts on the construction and maintenance of experimental falsificative apparatuses.

The writing reviews specific landscape preference and simulation projects, situates them within historical context, and isolates an appetence that emerges and repeats across the centuries: Can we effect periodic moments of astonishment by judicious deployment of mild hazards, facilitating a satisfying ratio of mystery to perceived danger?

Variations on the question appear in sources ranging from Uvedale Price's gardening treatises to Stephen and Rachel Kaplan's preference matrices. There evolves an interest in a dependable simulation format to serve as test apparatus for experiments to calibrate our understanding of landscape preference. Can we effect fine adjustments to the risk-mystery calculus in order to achieve a reliable

state of moderated sublimity? Is there a mechanism capable of anticipating the number and location of Burkean frisson nodes necessary to install within a subtending network of precaution to elicit optimum satisfaction?

This dissertation asks if a reinvigorated *Eidophusikon* might serve as such an apparatus—a tool with which we can deploy our understanding of simulation and scenic assessment to prototype settings in which individuals are subject to a regular influx of mysterious landscape values in exacting proportions. Drawing upon Loutherbourg's advances, the hope of this writing is to bolster further preference studies with enhanced and more closely correlated simulations.

At the same time, future researchers may draw upon this constellation of related works as they investigate the falsificative impulse in environmental social science literature. An important aspect of this dissertation is the suggestion of links between the work of simulation and the fabrication of languor—the false and the slow. In this sense, the aim of these pages is both an inversion and extension of Bachelard's project in *The Dialectic of Duration*. If Bachelard's was an effort to provide an introduction to the teaching of a philosophy of repose, the following may be seen as a guide to the repose of philosophy.

Acknowledgments

For Lulu

You made it all better.

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“The realm of delusional pictures is also part of nature and worthy of equal study.”

Friedrich Nietzsche

Introduction

When we speak of a sublime event we speak firstly of an intolerable force beyond our power of thought or our ability to fully succumb to its energy without obliterating ourselves in the process. A force that presses upon us with a sense of impending danger, of death, of our ultimate insignificance in the face of nature and time. Then we think of efforts we might undertake for the purpose of rendering the event safe, pleasurable and useful.

Deleuze and Guattari note that Freud catches sight of the oceanic unconscious at some very early point in his researches—a domain where anything is possible and everything is flowing. He sees non-specific conjunctions, partial objects,[1] confounding movements. And this is in some way intolerable to him. It is not until much later that he returns to tame it, to give it the name of Oedipus—to overlay a template where questions are not questions of production, but of representation: the complete Oedipus complex wherein the crux of the matter is signification. *What does it mean?* Freud draws back from the chaos he glimpsed and returns years later to restore a little order, theatrically, by inserting a familial dynamic drawn from the Greeks.

[1] Deleuze and Guattari, 54.

In the *Birth of Tragedy* Nietzsche traces the shift away from the pasture chants, folk rites, and *music* that nourished what was most confounding in the early works. Away from Aeschylus and toward Euripides. "Once it was no longer begotten by music, in the mysterious Dyonisiac twilight," Nietzsche writes, "What form could drama conceivably take? Only that of the dramatized epic, a form which precluded tragic effect."[2] As with Freud's operation, a template is set between the subject and direct experience—the mythical material is systematized "under the severe, rational eyes of an orthodox dogmatism."[3] The untamed, immoderate experience—intolerably radiant—requires a Euripides or the rationality of Socrates to apply logic to it, to tease a moral or a fable from it, to forge from it a kind of "genteel domestic drama."[4]

Vaihinger ends *The Philosophy of As-If* with an appreciation of Nietzsche, specifically his deployment of the false—what he calls his "doctrine of conscious illusion."[5] Vaihinger observes that our conceptual thinking is based upon falsifying operations. It is in fact the erection of a falsificative apparatus that enables every kind of complex thought. Vaihinger writes: "We must look upon these as mechanics look upon appliances—for practical

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[2] Nietzsche (1967), 77.
[3] Ib. at 68.
[4] Ib. at 88.
[5] Vaihinger, 341.

purposes and for the increase in power, that is to say as levers, pulleys, screws, or inclined planes."[6]

He sets to cataloguing the various sorts of acceptable fictions: symbolic, summational, heuristic, etc. Having won the reader over to the power of the false, the power of *As-If,* he then draws back. "Every fiction," must in fact "be able to justify itself by what it accomplishes for the progress of science."[7] There are rules: a fiction must not be superfluous; it must perform a service; and, importantly, *the extent of its influence must be determinable.*

We don't find caution of this sort in Nietzsche. For him, it is the *liberated* intellect that creates fictions as conscious aids and scaffoldings. He writes, "It is nothing but a moral prejudice that regards truth as of more value than illusion."[8] Nietzsche says explicitly: I am borrowing my adjectives from the Greeks "who developed their mystical doctrines through *plausible embodiments*, and not through purely conceptual means."[9] We must approve of the false.[10]

This is what we do. As beavers, as psychologists, as tacticians. We place our trust in the false. We construct the false. We approve of the false.

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[6] Ib. at, 101.
[7] Ib. at 105-6.
[8] Quoted in Vaihinger, 352. Original quote from *Beyond Good and Evil*.
[9] Nietzsche (1967), 19.
[10] Vaihinger, 347.

Burke notes the importance of speed in the sublime mechanism. And we erect fabrications to slow it down. Burke says that the sublime "anticipates our reasonings and hurries us on by an irresistible force."[11] When we have time to reckon with the full extent of any danger, "we can accustom our eyes to it and a great deal of the apprehension vanishes."[12] And so we create Vaihinger's "halting places for thought."[13] We mount simulation planes that might act as brakes upon Burke's irresistible force. In the following chapters, the labor involved in the production of duration is fore-grounded. Here the efforts of the artificer are detailed.

One task of this writing is to excavate a lineage of *practical demonstrations* wherein questions of matter and time, falsity and slowness, are enacted. Practices from divergent sources will be introduced, as will unorthodox methods of three-dimensional staging: the construction of all manner of functional blockages, dams, delays, sclerotic passages.

A few examples:

1. Two scale railroad environments are created in a laboratory. In the foreground there is a model train station and platform with scale human figures on it, and in the background a stationary model train. Synthetic ground cover and a circuit of track are laid on the base and blue skypaper

[11] Burke, 57.
[12] Ib. at 58-9.
[13] Vaihinger, 100.

covers the inside walls of the enclosure. A subject is brought into the dim room and seated in a comfortable chair. He is asked to remove his watch. The subject is instructed to look through a mask into a recessed apse containing the model tableaux, illuminated for realistic effect by an array of miniature light bulbs. The subject is told to pick one of the plastic human figures and imagine himself as that figure on the platform. He is told that he is waiting for a train that is due to arrive in 15 minutes. He is asked to imagine himself doing whatever he would do while waiting for a train. And he is told that when he feels 15 minutes have elapsed and the train should be arriving that he should push the button on the table beside him. Padded headphones are then placed gently over his ears and white noise is broadcast through them at a comfortable volume, and he is left alone in the twi-lit room to wait until he imagines fifteen minutes have passed and his friend on the train is about to arrive at the station.

2. In 1940 a woman waits in line for hours to be seated in a comfortable traveling chair upholstered in mohair, a fabric made from the fur of an Andorran goat—a fabric known for its warmth and its insulating properties. The chair begins to move slowly along a track, rising above a massive model of the United States 20 years hence. A small speaker installed behind her right shoulder narrates the future to her as she passes above its miniature realization—circulating around acres of scale landscape and witnessing productive cornfields, small towns with circuses on their

outskirts and revolving ferris wheels, misting waterfalls created by tiny nozzles hidden in the recesses of plaster mountain crags. The voice at her shoulder says, “Dawn is breaking. Another day is born.”[14]

3. A landscape in Ruisdael is modified to lessen its sense of dread and increase the proportion of positive Mystery. Brackish water is lightened and now appears to run fresh. An abundance of aquatic weeds are thinned. A collapsed and decaying tree is removed. The tableaux takes on a more reassuring cast. Rather than dangerous, it now offers a pleasing challenge, the promise that one might enter safely and learn more.

There is great potential in “terror, rightly managed,”[15] John Dennis noted in 1704. And Loutherbourg’s most vital discoveries revolve around the handiwork, the mechanics, the physical ingenuity involved in the process of domesticating hazards. He first displayed his Eidophusikon in a private home on Leicester Square.

Dennis further says: “Things that are powerful, and likely to hurt, are the causes of Common Terror. And the more they are powerful and likely to hurt, the more they become the causes of *Terror*, which Terror, the greater it

[14] Bel Geddes (1938)
[15] Quoted in Burke, xlviii.

is, the more it is joined with wonder, and the nearer it comes to astonishment."[16]

Kant tells us that the power of the sublime operates only through the mediation of displeasure. Both Dennis and Burke tell us that pain and fear are necessary elements if we are to experience the glories of the sublime.

Nietzsche, who had originally thought he would write his dissertation on Kant, makes it his task to keep isolating and foregrounding the pre-Platonic moments where "terrible, paralyzing thoughts" are transformed into "feelings of blessed astonishment."[17] And then, importantly, and more helpfully than Kant, he offers a bundle of stage tricks and tactics by which to create and sustain this feeling we're after.

In the 1960's and 1970's we begin to see the emergence of landscape preference studies and Scenic Assessment Methodologies—work that concerns itself with the evaluation of environmental intangibles. The achievement of the Kaplans, who came up in this era, and of those who have followed in their wake was the isolation of the *mystery* variable, and further experiments with various admixtures and configurations in an effort to determine an ideal aggregate landscape composed of mysterious and non-mysterious elements in proportions that will reliably produce satisfaction.

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[16] Ibid.
[17] Nietzsche (1969), 54.

If we want to take their work one step further—to reliably induce something like the satisfaction associated with prospect-refuge, or with standing at the foot of a rushing cataract—if we want to evoke what Price called that ideal state "betwixt languor and tension,"[18] then we begin to think of constructing environments exhibiting the moderated sublime—which occupies a further subdivision along this aesthetic spectrum, somewhere between the picturesque and the unadulterated sublime. The moderated sublime offers a gesture toward the *dangerous*—eliciting "that frisson of terror so central to the sublime experience."[19] And yet it elicits within a larger matrix of agrestiality.

There is a history, from Price and Knight to Wilson and Colomina, of landscape practice in dialogue with landscape theory. And as in the Eighteenth Century, the discussions revolve around the same core issues: intention, naturalness, disclosure, and the relationship between landscape and morality.

It is very clear that further cooperation between our field of environmental psychology and the field of landscape architecture is capable of effecting alterations to one's sense of space and time—alterations that

[18] Quoted in Hipple, 204.
[19] Cosgrove, 229.

enable subtle gradations in our prospect-refuge response, alterations capable of reliably triggering the mechanism of the moderated sublime.

During his lecture on Thales, Nietzsche points out that the philosopher experienced something overpoweringly strong, essentially incommunicable. He had seen the unity of all that is, and he found himself talking about *water.* He was driven by a metaphysical conviction that had its origin in a mystic impulse. But how to translate this sense to the outside world? Nietzsche says that Thales grasped after the right phrasing "in order to get hold of his own enchantment, in order to perpetuate it."[20]

Klossowski's simulacrum is "the actualization of something in itself incommunicable and nonrepresentable: the phantasm in its obsessional constraint."[21] We regard the various forms below—whether a choice of words, or the positioning of a fountain—as simulations of this order.

How do we construct the moderated sublime, set it in reliable motion? How might our efforts dovetail with the artificial induction of prospect-refuge response? What do we hope to inaugurate when we dig a header pool at the fore of our cascading water feature? What do we wish to evoke when we place a blue filter in front of a 60-watt outdoor bulb?

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[20] Nietzsche (1969), 44.
[21] Klossowski, *La Resemblance*, p. 76. Quoted in Klossowski (1997), xi.

Nietzsche confided to his students: “Thales is long gone, but a painter standing before a waterfall will agree with him.”[22]

[22] Nietzsche (2001), 26.

mystery

Over the past twenty years, the "rated Mystery" variable in landscape preference studies has become "one of the most frequently researched topics in environmental psychology."[1] As social science inquiries into subjective judgments of landscape proliferated the category accumulated a great volume of attendant literature intended to both define the variable more clearly and enhance its predictive power. In this chapter we will examine the evolution of the notion of *Mystery* in the work of Kaplan & Kaplan—and the subsequent research of Gimblett, Herzog, Stamps and others.

The Mystery construct as examined here is first fully defined in Kaplan and Kaplan's watershed 1989 text *The Experience of Nature*[2]; it appears as a determinant element on their "preference matrix." The Kaplans' matrix—composed of two binary dimensions—is firstly divided based upon the supposition that *understanding* and *exploration* are the major categories of human environmental need; an environment must be apprehensible and it must also allow opportunities for the expansion of one's knowledge. In the

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[1] Stamps (2007), 165.

[2] The concept as studied here appears in nascent form in Rachel Kaplan's "Predictors of Environmental Preference" (1973) and the Kaplans' "Informational Model of Landscape Preference," published in 1982—and that articulation is examined at some length in Gimblett, Itami, and Fitzgibbon (1985). The concept achieves its refined and most frequently-referenced form with the publication of *The Experience of Nature* in 1989. In this chapter, when referring to studies of the concept prior to 1989, the word will be rendered in lowercase; in referring to studies after its codification in 1989, it will be rendered "Mystery."

Kaplan model Mystery is a subcategory of the need for exploration, a factor in the environment that gives "promise that one could learn more." The Kaplans' matrix "evolved from extensive examination of the scenes that are most and least liked across numerous studies" and in many of these studies the scenes that were most preferred "reflect what we have called Mystery."[3]

The aforementioned scenes were presented to study respondents in the form of black & white photographic slides or prints. The Kaplans used photographs because "people's responses to the two-dimensional representation are surprisingly similar to what they are in the setting itself."[4] They argue, in fact, that this is not so counter-intuitive as it might appear at first:

> Much of the information that we consider all the time reaches us by means of two-dimensional representations of three-dimensional settings…It would, in fact, be much more difficult to justify a procedure that relied upon preference judgments made in the physical environment itself.[5]

When "seeing pictures in a book," for example, an individual is responding unproblematically to the same sort of dimensional modification.[6]

In preference studies it has been noted that photographs offer the additional research dividend of malleability; they are subject to fine-grain adjustment by researchers without much additional effort or expense.

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[3] Kaplan and Kaplan, 1989, 57.
[4] Ib. at 15. For corroboration of this view, see Levin (1977); Ulrich (1979); Shuttleworth (1980); Zube, Simcox, and Law (1987); and Sheppard (1989).
[5] Ib. at 16.
[6] Ibid.

> Photo simulations have two main advantages as a means of assessing reactions to possible futures. First, people's responses to two-dimensional representations of a setting are surprisingly similar to what they are in the actual setting. Second, pictures can be systematically manipulated to show different levels of independent variables while holding other variables constant.[7]

Finally, the Kaplans note that by limiting the scene-presentation to two dimensions and eliminating color administration of the study became more efficient and less costly. "By constructing the stimuli," they write, "the researcher has full control over their properties. And control is, after all, of utmost importance to the scientist."[8]

Having first established that the perceptual responses of viewers of their photographs are centered around two major criteria—content and spatial configuration—the Kaplans turned to *preference*.

> Perception is quite obviously important to survival. It is, for example, clearly adaptive to be able to perceive danger. But being able to perceive what is safe and what is dangerous is not enough. If the information an organism acquires through the power of perception is to aid in its survival, it is essential that it not only perceive what is safe but also prefer it.[9]

In the classic preference-study format researchers use "photographs of real environments and ask people to judge these for preference."[10] Participants view the scenes and indicate their preference using a 5-point rating scale from preferred "not at all" to preferred "a great deal."[11]

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[7] Kuo, Bacaicoa, and Sullivan, 1998, 36.
[8] Kaplan and Kaplan, 1989, 15.
[9] Ib. at 41.
[10] Ib. at 17.
[11] Ib. at 41.

The Kaplans performed many such studies as well as supervising or compiling the findings of concurrent, related research. In documenting the patterns that emerged they came to understand that "the study of environmental preference…shows remarkable consistency despite demographic differences and across diverse settings."[12] The Kaplans understood the data they were aggregating as not only amenable to generalization but as indicative of patterns of historico-biological significance. "Given these results there is reason to suspect that environmental preferences provide a glimpse into some essential ingredients of human functioning."[13]

	Understanding	**Exploration**
Immediate	Coherence	Complexity
Inferred, predicted	Legibility	Mystery

Table 1. *The Kaplan Preference Matrix (1989)*

The Kaplans' matrix owes much to the work of Jay Appleton, a British geographer who published *The Experience of Landscape* in 1975. Appleton suggested that the key to landscape preference might be found in *habitat theory*—the idea that our spontaneous perceptions of the environment are geared firstly to apprehending the visual "sign-stimuli indicative of

[12] Ib. at 40.
[13] Ibid.

environmental conditions favourable to survival."[14] Drawing upon ethology for support, Appleton writes that "the satisfaction which we derive from the contemplation of the environment, and which we call 'aesthetic' arises from a spontaneous reaction to that environment as a habitat, that is to say as a place which affords the opportunity for achieving our simple biological needs."[15] When a particular environment does not satisfy our needs in this way a human will experience "a sense of anxiety and dissatisfaction."[16]

Calling upon Lack's (1933) work on habitat selection Appleton notes that, despite seemingly great odds, migratory birds have no trouble identifying their ancestral rookeries—a feat of selective processing made possible by the fact that the site is recognized by its "conspicuous, not necessarily the essential, features."[17] The point is salient in that it underscores Appleton's broader point: the features we recognize as essential to survival are those which "in their shapes, colours, spatial arrangements and other visible attributes, act as sign-stimuli indicative of environmental conditions favourable to survival, whether they *are* favourable or not."[18] It is the contention of habit theory that we will prefer features that visually suggest "even by remote association"[19] the potential to satisfy our basic biological needs. "Ingestive

[14] Appleton, 1975, 69.
[15] Ib. at 70.
[16] Ibid.
[17] Appleton, 1975, 69.
[18] Ibid.
[19] Ibid.

requirements," for example are suggested by "smiling cornfields" or "limpid brooks."[20]

> When we attain a sufficient control over our environment to render the mechanisms by which we make this spontaneous appraisal of it no longer essential to the achievement of these biological needs, the mechanisms do not immediately die out in the species but continue to be transmitted from one generation to another and may, if needed, be called upon again to discharge their primitive function. More often, however, they are released from this function, which is to ensure the survival of the individual and the species, and we are then able to enjoy the satisfaction which results from the perception of a biologically favourable environment without uncomfortably exposing ourselves to the hazards against which this sensitivity to our surroundings would protect us in a 'state of nature.'[21]

First and foremost among our primitive requirements according to Appleton is the need to "see without being seen." The ability to continue to satisfy the remaining needs depends upon this "shorthand reaction to the environment."[22] No matter the activity or setting, environments are "first apprehended in terms of the ability to see without being seen."[23] Appleton credits the observations of Konrad Lorenz—who wrote extensively on instinctive aggression in animals and humans—with this condensation of habitat theory into something he called *prospect-refuge theory*.

> A creature *hunting* says to itself, "If I wish to catch my quarry I must do so before it can reach a place which is inaccessible to me. Such a place may be a hole in the ground, a pond, a tree-top, or simply, if the quarry has greater speed and stamina than I, a distant location from which it can move further as I

[20] Ibid.
[21] Ib. at 70.
[22] Ibid.
[23] Ib. at 71.

> approach. To minimize its chances of doing this I must approach as close as possible before it sets in motion the mechanism for achieving this escape, which means, in practice, before it notices me." *Per contra* a creature *escaping* says to itself, "If I am to escape successfully, I must ensure that I can reach a place inaccessible to my pursuer before he can prevent me. When, therefore, I am engaged in activities such as feeding, which involve the diversion of my attention from the activities of a potential pursuer, I must so position myself, if possible, that either he will not see me, or if he does, I will perceive him threatening me while I yet have time to reach safety."[24]

Whether hunting, seeking shelter, or exploring ("the master activity which lies behind the successful accomplishment of the others"[25] and a vital element in the Kaplan's matrix) *seeing and hiding* have a "unique complementary role to play" in the successful execution of the activity. It must be remembered that "the creature exploring is always potentially the creature escaping."[26] Prospect refuge theory is based upon the notion that the first focus of spontaneous visual perception, even for an exploring subject, is the proximity of a safe hiding place from which the subject might see without being seen. Once safe in such an environmental condition "perception is attended with pleasure; anxiety is set aside and relaxation is possible."[27] Appleton quotes Lorenz's work on shrews in support of his thesis:

> Exactly as mice and many other small rodents would do under similar conditions, the shrews interrupted their careful exploration of their new surroundings every few minutes to dash wildly back into the safe cover of their nest-box. The survival of

[24] Ib. at 70.
[25] Ib. at 71.
[26] Ibid.
[27] Ibid.

> this peculiar behaviour is evident: the animal makes sure from time to time, that it has not lost its way and that it can, at a moment's notice, retreat to the one place it knows to be safe. It was a queer spectacle to see these podgy black figures slowly and carefully whisker their way forward and in the next second, with lightning speed, dash back to the nest-box."[28]

If the primary source of aesthetic satisfaction in a landscape is its perceived capacity for positions where one might "see without being seen" then the next logical step is to ask after the types of landscape features that are visually associated with this objective. (see Figure 1)

[28] Lorenz, 1964, 100-101. Quoted in Appleton, 1975, 71. Burrows and nests will appear again and again in Lorenz—and resurface in Appleton.

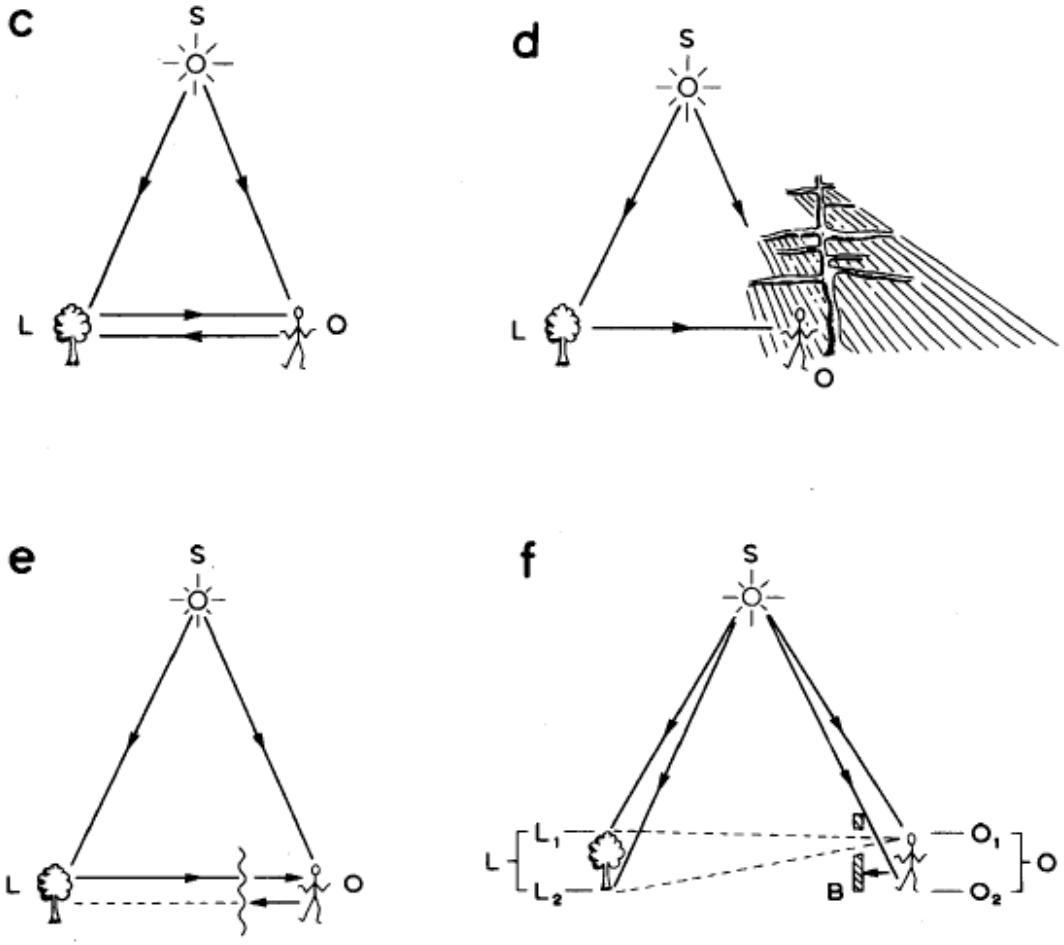

Figure 1. *Various arrays of "Seeing Without Being Seen" elements (Appleton,1975)*

> The strategic value of a landscape, therefore, whether natural or man-made is related to the arrangement of objects which combine to provide collectively these two kinds of opportunity, and when this strategic value ceases to be essential to survival it continues to be apprehended aesthetically.[29]

The aesthetic experience will be influenced by five underlying variables: the objects symbolizing prospects and refuges; the manner and amplitude with

[29] Appleton, 1975, 74.

which they are symbolized; the arrangements of the symbols in space; the balance between prospect and refuge symbols; and the physical media through which the symbol arrangement is presented to the observer.

In considering the imagery and symbolism of the *prospect* Appleton will divide the category into direct and indirect *prospects* and primary and secondary *vantage-points*. Prospects are divided into panoramas and vistas—with a panorama being "a wide view from a good vantage-point" and a vista being "a view which is restricted by conspicuous bounding margins."[30]

> All direct prospects are views actually achieved by the observer from his point of observation, which we can call his *primary vantage-point.* A very important role, however, is discharged by other potential vantage-points. It must be remembered that the satisfaction of seeing is only part of the satisfaction of achieving an advantageous position within one's habitat, and clearly the belief that one's field of vision can be further extended if one moves to another observation point will accentuate the sensation of environmental advantage. Such alternate observation points we may call *secondary vantage-points*, and the potential views which it is inferred may be obtained from them we may term *indirect prospects*.[31]

An example of a vista would be distant field viewed through a gap in an intervening screen of dogwood trees. An example of a secondary vantage-point (the primary being the viewer's subjective position of observation) would be a mountain crag overhanging a low vale.

In considering the imagery and symbolism of the *refuge* Appleton offers five refuge classifications that are not mutually exclusive—meaning

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[30] Appleton, 1975, 85.
[31] Ib. at 89.

"any refuge can be referred to all five."[32] A refuge can be classed by function; by origin (i.e. natural or artificial); by substance (whether a reedy gully or a cave penetrating into a rocky outcropping); by accessibility; or by efficacy. For Appleton, "the refuge necessarily involves protection against some hazard" and as part of his "hide-and-seek aesthetics"[33] might include anything from a rough shelter to a distant castle to an orifice which allows "a creature to enter physically into the fabric of the earth."[34]

Following Appleton, it is the contention of the Kaplans—explicated first in their 1982 text *Cognition and Environment* —that human information-processing evolved as early humans left the trees to live on the ground. The landscapes and vistas that promoted survival were preferred for precisely those reasons then and our current landscape preferences are vestiges of an ancient adaptation to dangerous, unpredictable terrain.

> The evolutionary environment may have been different in many respects from the contemporary one, but it is that one that shaped man's genetic structure, and thus, to a substantial extent, his current needs. And in terms of the basic issues of space, time, and uncertainty the contemporary environment is by no means dissimilar. An analysis of that primal environment is thus an essential first step in understanding contemporary man-environment relationships.[35]

In 1973 Stephen Kaplan laid theoretical groundwork for this conception in describing "the human needs underlying environmental preference"[36] as

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[32] Ib. at 102.
[33] Ib. at 101.
[34] Ib. at 103.
[35] Kaplan, 1973, 277.
[36] Ib. at 275.

recognition, *prediction*, *evaluation*, and *action*. *Recognition* is defined as "the bias towards interpreting new events in familiar terms"[37]; *prediction* is defined as "the enjoyment involved in guessing about possible outcomes"[38]; *evaluation* is defined as "delight in dividing up the world into good guys and bad guys" to ameliorate "the discomfort generated by ambivalence"[39]; and finally *action* is defined by "the exercise of skill, to act in such a way as to have predictable results."[40] These elucidations of the "deep and ancient human concerns"[41] will undergird the next thirty years of environmental preference studies though their classification of essential human biases will rarely be so unambiguously detailed. It is important to note that the need for prediction—which suggests the pleasure to be found in guessing—is closely shadowed by the urge to evaluate—the need to find resolution based upon precedently settled territories on a cognitive map. A "competence supporting" environment should be "rich and varied" but "there must be a degree of pattern, of order, running through the variety."[42] In fact, Kaplan writes, "variety can only be appreciated in the context of order."[43] Complexity and ambiguity are of interest as medial—and surmountable—obstacles on the path to cognitive equilibrium. "Uncertainty, as far as humans are concerned, exists to be resolved."[44] Real satisfaction is found when the

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[37] Ib. at 276.
[38] Ibid.
[39] Ibid.
[40] Ibid.
[41] Ib. at 281-2.
[42] Ib. at 279.
[43] Ib at 280.
[44] Ib. at 280.

ambiguity of an environment dissipates and is replaced by a sense of confidence that the environment is, and will remain, stable in its meaning.

In terms of spatial configuration the Kaplans found that respondents consistently preferred scenes showing "open, yet defined" areas with "relatively smooth ground texture and trees that help define the depth of the scene."[45] They call such a configuration *parklike* or, in a nod to Appleton's prospect-refuge theory, *savanna*. "Mean preferences for these are always among the highest, ranging between 3.7 and 4.2"[46] on the 5-point rating scale. As for content, "the most preferred content-based categories have generally been ones where nature is dominant in the scenes."[47] The highest rated scene in this regard was a photograph from a 1978 study by Hammitt that showed a tidy planked walkway curving into a lightly wooded area.

Somewhat earlier Gilpin anticipates the outline of the Kaplan's preference matrix in his writings on the effects of landscape. The first source of satisfaction for a traveler in a landscape, he writes, "is the *pursuit* of his object—the expectation of new scenes continually open and arising to his view

> Under this circumstance the mind is kept constantly in an agreeable suspense. The love of novelty is the foundation of this pleasure. Every distant horizon promises something new;

[45] Ib. at 48.
[46] Ibid.
[47] Ib. at 44.

> and with this pleasing expectation we follow nature through all her walks.[48]

The author gives voice to the sometimes indiscernible assessments we make of the landscape around us—and to the sources of their satisfaction—when he writes, "After the pursuit we are gratified with the *attainment* of the object.

> We compare the objects before us with other objects of the same kind—or perhaps we compare them with the imitations of art. From all these operations of the mind results great amusement. But it is not from this scientifical employment that we derive our chief pleasure. We are most delighted, when some grand scene, tho perhaps of incorrect composition, rising before the eye, strikes us beyond the power of thought…in this pause of intellect, this deliquium of the soul, an enthusiastic sensation of pleasure overspreads it, previous to any examination by the rules of art. The general idea of the scene makes an impression, before any appeal is made to the judgment.[49]

The achievement of Appleton, the Kaplans, Shuttleworth and others is to have understood that what struck Gilpin as "beyond the power of thought" is by no means beyond the power of research. While preserving—and fleshing out—Gilpin's categories of landscape preference, and extending his inclination for careful taxonomy, this new alliance of researchers tempered his more incautious enthusiasms while at the same time devising new methodologies by which we may *quantify* the effects and significance of this "deliquium of the soul."

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[48] Gilpin, 1794, 3.
[49] Ibid.

While Gilpin writes with great vitality, the Kaplans are able to deploy the latest scenic assessment techniques and put his notions of the picturesque to the test. They seek to identify landscape features that offer more satisfaction than others and begin the process of explaining how and why this is. In their study of perception and preference the Kaplans note the importance of legibility—how easily a scene can be grasped and its information assimilated.

> The categories based on spatial configurations suggest that the perceptual process is sensitive to the relative openness and spatial definition of the setting. Preferences for the resulting categories show that preferred settings are those where it is easiest to extract the information needed to function. In the very open and in blocked areas it is more difficult to anticipate what might happen, and preferences tend to be relatively low. In spatially defined areas and in open forests, by contrast, it is far easier to judge where one can venture safely and what to expect. Such categories tend to be highly favored.[50]

By way of contrast, when presented with a scene in which they do *not* know what to expect, viewers find it unsatisfactory. Ulrich summarizes the Kaplans' distinction thusly:

> To be preferred, therefore, a scene should not only present information, but it should also be identifiable and easily grasped. Conversely, a scene that is ambiguous and resists identification, or which places very high processing demands on the observer, should be less preferred[51]

When confronted with a scene that is difficult to apprehend a viewer may exhibit frustration and/or hostility. The Kaplans compare this reaction to

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[50] Ib. at 49.
[51] Ulrich, 208.

that of individuals who "view modern art that fails to make sense to them."[52] Unable to draw immediate meaning from a scene or assimilate its elements into a satisfying, actionable construct the viewer becomes resentful: "Even reasonable, kindly people can become hostile and angry when they cannot comprehend material that seems to be necessary to functioning."[53]

However, there *are* scenes where a limited sort of ambiguity may not only be tolerated but actually preferred by viewers and provide real satisfaction. It was the quest for a means to express the quality inherent in such an informational factor that led to the Kaplan conception of the Mystery variable. A Mysterious element of a scene is one that suggests that, beyond one's current vantage point, new information might be gained. There is in a Mysterious scene "*the promise that one could learn more*." And how does a scene express Mystery?

> There are several ways that scenes or settings can suggest that there is more information available. Some classic examples include the bend in the path and a brightly lit area that is partially obscured by foreground vegetation. Partial obstruction, often from foliage, and even modest land-form changes can enhance this sense of Mystery.[54]

The Kaplans make clear that Mystery by their definition should not be confused with unpredictability. "A path leading to a visible closed door

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[52] Kaplan and Kaplan, 1989, 51.
[53] Ibid.
[54] Ib. at 55-56.

suggests surprise but not Mystery."[55] A Mysterious element is one which provides information "that is continuous with what is already available, rather than a surprise."[56] They are careful to note that Gordon Cullen's conception of mystery—"where anything could happen or exist, the noble or the sordid, genius or lunacy"[57] is not one they are inclined to share. For the Kaplans it is the 1917 work of Hubbard and Kimbell that provides a sense of mystery more amenable to their own—mystery as "a pleasant challenge."[58]

After the Kaplans first published their Informational Model of Landscape Preference in 1982 Gimblett, Itami and Fitzgibbon chose to examine the Mystery variable specifically, and at some length, to determine whether "observers perceive this dimension as an independent attribute of landscape scenery, and examine the physical factors which contribute to this perception."[59] A group of thirty-six research subjects were shown 191 photographs of rural landscape views from southern Ontario "which gave a thorough coverage of all combinations of landform and land cover for the study area."[60] The respondents were first shown ten photographs in a "pre-test" to give them "a chance to clarify their understanding of the definition of mystery"[61] and then they were asked to rate each of the 191 photographs for

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[55] Ib. at 56.
[56] Ib. at 56.
[57] Ib. at 57.
[58] Quoted in Kaplan and Kaplan, 1989, at 56.
[59] Gimblett, Itami, and Fitzgibbon, 87.
[60] Ib. at 89.
[61] Ibid.

its “degree of mystery” on a five-point scale: 1 indicating “low mystery” and 5 “high mystery.”

The authors report that their results “conclusively indicated that mystery was perceived by the respondents as a clear concept”[62] and they were able to isolate physical landscape attributes associated with Mystery: screening, distance of view, and spatial definition. When respondents were shown photographs of forested landscapes two other attributes emerged as Mysterious: physical accessibility and “radiant forest.”

Mean Ratings **Mystery Class**	1.0 to 2.0 Low	2.0 to 3.9 Moderate	4.0 to 4.5 High
Screening	None	partial	Partial to full
Distance of View	Far	moderate	close
Spatial Definition	Open	partially enclosed	enclosed
Physical Accessiblity	_____	_____	defined path
Radiant Forest	_____	_____	forest illumination

Table 2. Physical Attributes of Mystery
(Gimblett, Itami, Fitzgibbon. 1985)

[62] Ibid.

Screening is defined as "the degree to which views of the larger landscape are visually obstructed or obscured."[63] The most common screening agents in these photographs were vegetation and heavy shading or shadowing. "Vegetative screening consistently appears in those photos rated high for mystery and is less prominent in those photos ranked low for mystery."[64]

Distance of View "is measured from the viewer to the nearest forest stand."[65] The researchers found that as the initial forest stand increases in distance, mystery ratings tend to decrease. The closer the stand of trees, the more acutely felt is the opportunity for exploration. Distant vegetation loses the viewer's sense of involvement.

Spatial Definition "is the degree to which landscape elements surround the observer."[66] Respondents articulated the category as a spectrum moving from openness to enclosure. Overhead canopy, vertical vegetation, and dark, defining shadows all contributed to a feeling of enclosure. Respondents consistently gave high ratings to scenes exhibiting this sort of enclosure. "Generally, as spatial definition increases, mystery increases."[67]

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[63] Ib. at 90.
[64] Ibid.
[65] Ibid.
[66] Ibid.
[67] Ib. at 91.

Physical Accessibility "is defined by an apparent means of moving through or into the landscape as a result of finely textured surfaces in the foreground ground plane."[68] In scenes showing wooded areas, some means of entry increased reported mystery. "Generally, as physical accessibility increases in wooded scenes, mystery increases."[69]

Radiant Forest "is an attribute for special cases in wooded areas where the immediate foreground is in shade and an area further in the scene is brightly lit."[70] While the foreground of these scenes may have been dark, further on there was a well-lit area, which appeared amenable to exploration, and promised new information if the viewer simply moved into the light.

Subsequent research further validates the physical typology of mysterious landscapes, though some differences have been noted that give rise to questions about the extent that we can generalize about the relationship between mystery and preference. In Woodcock (doctoral research, done under the supervision of Stephen Kaplan)[71], we see corroboration of the salience of both light and a sense of enclosure to high mystery ratings, though the author notes gender differences in landscape preference. He relates the distinction to evolutionary adaptations based upon the different roles men and women occupied following their descent

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[68] Ibid.
[69] Ibid.
[70] Ib. at 92.
[71] Woodcock, 1982.

from the trees and emergence on the savanna—men as hunters, women as gatherers. In the study, two hundred Michigan college students were shown 72 slides of landscape photographs, asked to rate them on a 5-point scale, and then instructed to fill out questionnaires regarding their environmental preferences and experience. While male respondents tended to divide the slides they viewed into prototypes—savanna and rain forest—and prefer the savanna view, women made no such separation, but tended to "center their organization around forest views."[72] Woodcock suggests that the preference in female respondents for such scenes is related to a forest milieu's greater safety for the activity of food gathering. He noted that "mystery played a significant role only in male preference."[73]

[72] Quoted in Kaplan and Kaplan, 1989, 287.
[73] Ibid.

Figure 2. Respondents found this scene “highly mysterious.”

On the heels of the Kaplans’ work, there have been hundreds of preference studies following similar protocol, delving further into the issues related to and raised by the Mystery category. The Kaplan conception of Mystery has proven so fruitful for researchers—and has achieved such wide acceptance and utility—that it has been suggested that their sense of the word should be referred to in scholarly articles as *mystery*$_{(K)}$.[74]

[74] Stamps (2007), 184.

Figure 3. Respondents found this scene “somewhat mysterious.”

Yet despite its high profile, many important questions remain unanswered, including: What is the precise nature of the relationship between Mystery and preference? and How might we more accurately predict which scenes viewers will find appealingly Mysterious? Stamps agrees that “there is some sort of relation between mystery and preference”[75] but because “reported correlations of rated mystery with rated pleasure have ranged from -

[75] Stamps (2003), 13.

.45 to +.95"[76] the relationship has yet to be satisfactorily defined, "leaving the mystery of environmental mystery a wide-open mystery."[77]

Figure 4. Respondents found this scene "not mysterious."

There is a small but growing body of literature, however, suggesting that researchers may be approaching their goal of working out the particulars of the mystery/preference interrelationship. Herzog, for example, is confident that the relationship is a positive one—"One of the most firmly established findings in the environmental preference literature is that mystery is positively

[76] Stamps (2007),
[77] Ibid.

related to preference"[78] –though he notes that "in recent years, a serious challenge to the generally positive role of mystery has arisen from research in environmental criminology."[79]

> Findings from this research suggest that some of the same features known to enhance mystery, such as vegetation and concealment, may also enhance perceived danger/fear in certain situations.[80]

It must be remembered that a Mysterious setting for the Kaplans is a scene in which "one can learn more in a cognitively comfortable and safe fashion."[81] When a respondent's sense of comfort or safety is in doubt, reported satisfaction undergoes dramatic decline. For optimal Mystery, the landscape should provide, or be retrofitted with, "a partial view or a suggestion of what might be ahead."[82] In a later chapter we will revisit this dynamic and examine the interrelationship between Mystery and other, sometimes negative, reported respondent reactions. It will be the task of that chapter to ask after possible methods we might utilize to preserve Mystery's positive effects, while mitigating or reducing its adverse ones. First, however, we will survey the methods and test equipment that allow us to experimentalize the variables and investigate the particulars of environmental preference.

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[78] Herzog (1998) 429. He will cite, among other studies, Herzog & Gale (1996), Herzog & Bosley (1992), and Herzog (1989 and 1992).
[79] Ib. at 430.
[80] Ibid.
[81] Kaplan and Kaplan, 1989, 69.
[82] Kaplan, Kaplan, and Ryan, 1998, 43.

modeling

Visual simulations have proven useful over the years for researchers in many disciplines—including geography, landscape architecture, and environmental psychology. The practice of using models to illustrate three-dimensional relationships is an ancient one—"among the earliest examples being found in Egyptian and early Chinese tombs."

> Their use for the study of environments increased considerably during the Renaissance. For example, Partner (1976) has reported that Peruzzi and Sangallo undertook studies in 1535 for the making of a scale model from which builders would work directly for the construction of St. Peter's in Rome.[1]

The Library of Congress has in its collection several examples of relief models of the sort constructed by aboriginal inhabitants of Northern Greenland—representing their geographical surrounds in sealskin and driftwood.

In the field of environmental psychology, scale models have been used in preference studies to represent environments ranging from a single room (Lau, 1984), to a small urban park (Kaplan and Kaplan, 1981), to a detailed dynamic model of Niagara Falls, complete with adjustable water flow and variable erosion settings (Zube, 1980). In borrowing material techniques from this venerable form of spatial representation, researchers have sought to craft

[1] Zube, Simcox, and Law, 1987, 63.

environmental simulations that might effectively and accurately render surrogate[2] landscape views in experimental settings.

> The idea of simulation as a simplified laboratory rendition of a naturally occurring environment or event is neither new to the behavioral sciences nor to the design professions, having been an integral part of the decision-making apparatus of both disciplines for many years. Numerous distinct research methods in both fields—some older than environmental psychology itself—may legitimately be included under the rubric of simulation techniques.[3]

The Oxford English Dictionary defines a simulation as "a false resemblance or display, a surface resemblance or imitation *of* something." In the field of environmental psychology, simulations are the family of techniques deployed to replicate, modify, or fabricate everyday environments in a laboratory setting. As regards landscape preference testing, the natural emphasis is on "research techniques and methods that permit the environmentalist to assess systematically the effects of a given environment on a specified subject population."[4] That being the case, researchers look for methods and materials capable of achieving accurate resemblance and aiding furtherance of

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[2] Daniel and Ittelson (1981) make the point that the term *simulation* is used rather loosely in environmental and behavior literature. They note that the term *surrogate* suggests a stand-in "recognized as being different from the environment" while a simulation "assumes the (counterfeit) appearance of the environment." At issue is whether subjects in perception research are responding to a simulation that they are recognizing *as a simulation*, or whether they understand the research question as pertaining to the environment the surrogate stands-in for—and giving responses to the landscape they understand as being represented. In this writing, the terms will continue to be used loosely.

[3] McKechnie, 1976, 170.

[4] Ib. at 180.

> the development of a simulative research-technique for predicting human response to future environments before they are built, or before existing environments are modified, plus the empirical evaluation of the predictive capability of the technique. The latter would be achieved through systematic field experiments to appraise the ecological validity of the simulation system.[5]

It has become commonplace to understand falsificative apparatuses as dishonest—of ill ontological repute. It is Vaihinger who began the modern rehabilitative process of systematically cataloguing the illusions and inventions upon which the sciences lay their foundations—and through which their future advances are nourished and irrigated. Drawing upon Kant's notion that all illusion consists in holding the subjective ground of judgment to be objective, Vaihinger began his project by examining the way in which illusion—a sense of "as-if"—had been historically used to structure abstract thought of all kinds: "Between 1877 and 1879 I had made a note of the most important *As If* passages in Kant's works, and I now completed this in an exhaustive manner."[6] The author catalogues countless falsificative apparatuses, the common element of which "is the immense practical value which these constructs possess although there is no corresponding objective reality."[7]

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[5] Ibid.
[6] Vaihinger, xi.
[7] Vaihinger, 49.

Vaihinger's book concludes with an appreciation of Nietzsche's appreciation of the utility of our false constructions and operations and

> the conscious deviation from reality to be found in myth, art, metaphor, etc. The intentional adherence to illusion, in spite of the realization of its nature, is a kind of 'lie in the extra-moral sense'; and lying is simply the conscious and intentional encouragement of illusion.[8]

Nietzsche was already tracking the roots of illusion and its germinal presence in science and philosophy when he wrote *The Birth of Tragedy*, wherein raw Aeschylian impulse is transformed over time into Euripidean logic and gentility.

> I have borrowed my adjectives from the Greeks, who developed their mystical doctrines of art through plausible embodiments, not through purely conceptual means.[9]

If, as Nietzsche and Vaihinger maintain, the whole of "our conceptual thinking is based upon falsifying operations,"[10] then the crux of the issue is not adjudicating the truth-value of the artificial constructions, but rather the search for the most productive deceptive mechanisms.

For an experimental simulation to be considered ecologically valid[11] it must demonstrate requisite similarity with the originary stimulus—the extent of the correspondence being ascertained by correlating reactions to the simulation with the in-situ response.

> Because environmental psychology "deals with human behavior in response to or in interaction with quite *complex* stimulus

[8] Vaihinger, 342.
[9] Nietzsche (1956), 19.
[10] Vaihinger, 345.
[11] See Brunswick, 1956, for elaboration.

> settings," it is vital that researchers are "able to capture the complexities of the environment as well as the complexities of the resultant human responses."[12]

Shuttleworth has observed that "perhaps the most problematic of the methodological issues in landscape evaluation and landscape preference research concerns the method of presenting views to be studied to the participants."[13] The question might naturally arise: Why use simulations at all? When assessing responses to landscape, why not measure the respondents' reaction to the landscape itself? Shuttleworth responds:

> A not inconsiderable problem posed by on-site survey is that the experiences obtained are more difficult to control than in a laboratory particularly because different respondents employ different approaches in an observational strategy which can make indeterminate the precise nature of the environmental display which has in fact been presented to the observers. Hence, the degree of equivalence of presentation among observers, which represents the tacit basis of subsequent analysis, may be reduced.[14]

Moreover, as far as securing valid results in landscape preference studies, "several researchers have expressed the view that it is impossible to take the numbers of respondents which are statistically necessary for social survey approaches round all the available landscapes."

> In view of these practical difficulties, most landscape researchers have been deterred from using on site-surveys of the environment. There is thus a requirement for some technique which can accurately represent landscape by using some surrogate convenient for large scale social survey approaches.[15]

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[12] Streufert and Swezey, 1985, 99.
[13] Shuttleworth, 1979. 64.
[14] Ib. at 62.
[15] Ibid.

Rather than on-site survey, a vast majority of researchers in landscape preference have turned, "for reasons of efficiency, safety, convenience and others,"[16] to "stimulus substitutes"[17] such as photographs, models, and other representations for their studies—tools that are, crucially, "portable, malleable, and manageable."[18]

With the notion of stimulus-substitutes arises the question of visual symbolism generally and the extent and quality of its agreement with "natural," apprehended reality. It is Gombrich who has addressed the topic in the greatest depth and who argues that humans react to "minimum images"—that our capacity to do so is in fact an integral part of our ability to survive—and that "the world of man is not only a world of things; it is a world of symbols where the distinction between reality and make-believe is itself unreal."

Gombrich, too, will marshal ethology and the work of Lorenz to support his thesis. He details the work of animal behaviorists who construct simulations of eggs, sticklebacks and the like—drawing instinctual reactions from the false objects—in order to demonstrate that for humans "our twin nature, poised between animality and rationality, finds expression in that twin world of symbolism with its willing suspension of disbelief."[19] In psychology,

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[16] Ervin, 2001, 1.
[17] Shuttleworth, 1979. 64.
[18] Ervin, 2001. 1.
[19] Gombrich, 1960, 102-3.

the practice of administering Rorschach inkblots capitalizes upon the human impulse to project familiar images onto vague or fragmentary visual stimulus.

> It is up to us how we define a mountain. We can make a mountain out of a molehill, or ask our landscape gardener to make one. We can accept the one or the other according to our wish or whim. There is a fallacy in the idea that reality contains such features as mountains and that, looking at one mountain after another, we slowly learn to generalize and to form the abstract idea of mountaineity.[20]

In environmental psychology, Winkel and Sasanoff have addressed the difficulties of rendering the salient elements of a large system accurately and legibly for analysis in a controlled setting. They note that techniques have been developed capable of rendering interrelationships between system elements that had heretofore been nearly impossible to quantify, and that, echoing Gombrich, exact correspondence is not necessarily the goal:

> Current work in the area of large-scale systems has led to the development of techniques which have been given the generic term "simulations." The most reasonable definition of this term is given by Thomas and Deemer (1957). They suggest that "to simulate is to attain the essence of, without the reality." Inherent in this definition is the realization that complete realism is not necessary for successful simulation. Successful simulation requires only that one be able to reproduce the system under study as accurately as possible without actually employing the system itself.[21]

Of course not all systems of visual symbolism are equally suitable for preference testing. The pertinent question regards the cultural valence of the particular simulation technique, and the extent of its remove from visual reality

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[20] Ib. at 100.
[21] Winkel and Sasanoff, 1970, 622-3.

as instantly apprehended by the viewing subject. A contour map, for instance, is an accurate symbolic representation of physical relief where altitude is suggested by sequences of isograms joining points of equal elevation. Such a map, however, has very little generalizable validity for preference studies—beyond perhaps a small population of alpinists. Gombrich warns against tarring all symbolic representations with the same brush; there are those that can be understood, immediately, by a viewer accustomed to the visual conventions in which the representation traffics.

> There are inventions in the history of art that have something of the character of (an) open-sesame. Foreshortening may be one of them in the way it produces the illusion of depth; others are the tonal system of modeling, highlights for texture, or those clues to expression discovered by humorous art…The question is not whether nature "really looks" like these pictorial devices but whether pictures with such features suggest a reading in terms of natural objects.[22]

Comprehensive knowledge of the appropriate level and scale of the symbolic materials—coupled with extensive and meticulous planning—will enable simulations to be developed in such a way as to safeguard the expectation of sufficient equivalence.

Craik developed a "Process Model for Assessment of Environmental Displays" in order to array the variables involved in using simulations to study human response to the physical environment. The four variables identified were *Observers*, *Media of Presentation*, *Response Formats*, and

[22] Gombrich, 1960, 360.

Environmental Dimension. The pertinent variables for this chapter are *Media* and *Environmental Dimension*. The variable *Media*

> addresses the question of the adequacy of the simulation *per se*. Which techniques are subjectively the most realistic? Which yield the human responses that are most similar to responses of observers in the real environment? Which medium yields the psychological judgments that are most highly correlated with the physical parameters of the environment?[23]

It is in the best interest of those involved in landscape preference research to fabricate experimental stimulus settings in such a way that they might have increased predictive validity and hew ever more closely and reliably to the phenomena being investigated, so as to allow for "a meaningful level of analysis."[24] Appleyard concurs:

> While simulations can be realistic, they still may not be accurate in their representation of a project or its consequences. The trees may not grow; the color may be different; there may be more traffic. All media can distort accuracy. However, those media that give more information about the real world are more open to reality tests. Several views of a project, at least, provide a more accurate idea of intentions than a single view.[25]

The variable *Environmental Dimensions* concerns the physical characteristics of the actual environment the psychological responses correspond to, and

> refers to the standardized description or measurement of the environment being displayed. Such standards to which the reponses of a given observer may be related, usually take the form of physical dimensions (e.g. morphology, climate, size, color, and temperature) measured with instruments of known validity and reliability, or they take the form of psychological

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[23] McKechnie, 1976, 182.
[24] Streufert and Swezey, 1985, 99.
[25] Appleyard, 1977, 60.

> descriptions made by experts and based upon long-term exposure to the displayed environment.[26]

It is vital that, prior to the fabrication of the simulation, there is verification of and agreement on the relevant features of the landscape to be modeled.

The great majority of preference studies have used static two-dimensional photographs instead of three-dimensional models—for reasons related to budget and purported compatibility with scientific generalization. In recent years, however, a compelling case has been made for the use of dynamic models in perception studies. McKechnie observes

> As a research technique, dynamic perceptual-simulation allows the experimental psychologist to encompass, within the controlled conditions of the laboratory, complete replicas of everyday physical environments—streets, neighborhoods, even entire cities. It is thus possible to manipulate these environments systematically to test hypotheses and build environmental theory. Using dynamic simulation-techniques, it is feasible for example to study experimentally (using classical experimental designs) such interesting topics as the imageability of cities (Lynch, 1960) and the effect of imageability on human behavior, the consequences of architectural aesthetics (Craik, 1971) for mood, or the effect of visual pollution on spatial orientation.[27]

Recent publications by Heft and Ervin suggest that representational alternatives that are dynamic (rather than static) and three-dimensional (rather than two-dimensional) may offer new and more accurate information about the way our perceptions of the environment are formed.

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[26] McKechnie, 1976, 182.
[27] McKechnie, 1976, 177-8.

While conceding that empirical studies have found responses to photographs similar to those obtained in situ, Heft questions whether a methodology based on viewing static images can truly do justice to "the detection of invariant properties of the environment in the context of a changing array of stimulus information."[28] As locomotive creatures in an environment that is constantly, if sometimes almost imperceptibly, in motion, there are changes in the visual field—optical flow, motion parallax, optical occlusion, and disocclusion—that cannot be represented accurately by a two-dimensional still photograph. His research, comparing reactions to dynamic and static displays of the same environment, found that "preference ratings in the dynamic condition were more strongly correlated with a wider range of variables"[29] and "preference ratings in relation to dynamic displays were quite a bit thicker and richer than they were in relation to static displays."[30] McKechnie offers support for this thesis and suggests that, additionally, dynamic modeling has the potential to set in motion a surrogate environmental arrangement capable of rendering vital, if unexpected, data—fortuitous residuum likely inaccessible through static means.

> Perceptual simulation attempts to provide tangible, concrete replicas of or isomorphs of environments—often future environments—that can be displayed to observers for their evaluation or other response. Dynamic simulations provide a recursive or interactive capability, such that often unanticipated new information is generated from the multiple, complex parts of the system. Static simulations lack this interactive capability and instead merely extract known aspects of the environment.[31]

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[28] Heft, 2000, 302.
[29] Ib. at 301.
[30] Ib. at 315.
[31] McKechnie, 1976, 174.

For his part, Ervin notes that "historically the vast majority" of landscape representations have been "flat, 2-D and presented in a rectangular frame" but suggests that new research in cognition and new information-management techniques have "made available a number of representational alternatives, which are not (so) limited to the flat or the rectangular (though these attributes pervade almost all of our representational paraphernalia, as we'll see.)"[32] Reading Ervin in conjunction with Heft and Nasar leaves the distinct impression that some basic changes in preference study display media might have enormous impact on landscape research.

> A rather limited presentational mode has dominated research on environmental preference and aesthetics. On theoretical grounds drawn largely from Gibson's ecological approach, we anticipated perceivers' responses to dynamic displays versus static displays to be different. We believe that our data support this admittedly general claim, and to the extent that they do (and that the findings can be generalized to a broader participant population), the present research should prompt investigators in these and related areas of research to move beyond static displays as the sole way to present representations of environments to perceivers. By doing so, not only will an empirical literature on the experiential nature of dynamic displays be generated, but also, a better understanding of how the current literature based on static displays might be translated into predictions of reactions in situ will become possible.[33]

In seeking to modify current simulation media and work toward more sophisticated methods of presentation, there are two important primogenitors—the achievements of which current researchers would ignore to the detriment of their undertakings. The first is Appleyard and Craik's

[32] Ervin, 2001, 2.
[33] Heft and Nasar, 2000, 318.

Berkeley Environmental Simulation Laboratory; the second is Loutherbourg's Eidophusikon. Both projects utilized three-dimensional landscape models for the purpose of dynamic perceptual simulation. Though the two lines of research were conducted separately, correspondences and corroborations abound. Viewed together, their advances—both technical and in terms of insight into human perception—offer inspiration and guidance to the researcher working toward the generation of more accurate and efficient stimulus substitutes.

The Berkeley project was one of the earliest efforts by environmental psychologists to use a large-format scale model in perceptual research. Lines of inquiry that would have been considered prohibitively expensive or inconvenient in the past were rendered attainable by the apparatus.

> The Berkeley environmental simulator provides the environmental psychologist with a convenient, efficient, and precise means of systematically testing research hypotheses at a level of molarity that heretofore has not been amenable to direct laboratory manipulation and control. In so doing, the simulator offers environmental psychology an empirical technique that may help bridge the gap between research and application, a problem that for too long has characterized the field.[34]

The project was initiated in 1968

> when a prototype simulator was purchased from Yale University. In 1971, a National Science Foundation grant to the Institute of Urban and Regional Planning and the Institute of Personality Assessment and Research on the Berkeley campus of the University of California permitted the design, construction, and validational appraisal of a new and vastly improved simulator under the direction of Professors Donald Appleyard

[34] McKechnie, 1976, 188.

> and Kenneth H. Craik. This collaboration reflected Appleyard's interest in simulation as a research and design tool (Appleyard, Lynch, and Myer, 1965), begun in 1958 at M.I.T. as part of a study of the environmental experiences of the urban traveler, and Craik's (1970, 1973) increasing involvement in research issues surrounding human comprehension of the everyday physical environment and the application of psychological-assessment techniques to problems in environmental psychology.[35]

The simulator consists of a needle-shaped optic probe, suspended from a motion-control gantry, "capable of movement in all three directions, plus pitch, roll, and yaw rotations"[36] –and connected by relay signal to a film or video camera. Operated remotely, a stepping motor and gearbox move the camera apparatus along the spanning framework, allowing the probe to travel close to a scale model beneath and send a visual signal back "that will enable one to 'walk' or 'drive' though small three-dimensional scale models of urban, suburban, and natural environments."[37] (see Figure 5)

> For any model down to the scale of approximately 1"=30' the lab can provide a human eye-level "drive" or "walk" through the simulated setting. For models below this scale of miniaturization (e.g. 1"=100'), the apparatus provides "helicopter passes" over the model. The total land area that can be simulated in the lab is a function of the model scale. The simulator can span a model 24 feet wide by 3 feet high and approximately 44 feet long. At the present standard scale of 1"=30', this represents a land area of 4.9 square miles (1.64 miles wide by 3.0 miles long), with a maximum elevation of 1,080 feet above the model base.[38]

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[35] McKechnie, 1976, 174-5.
[36] Ib. at 175.
[37] Ibid.
[38] Ibid.

One of the goals of the project was to develop the experimental capacity to process information related to large-scale physical environments while retaining the perspective of a single individual.[39] At the same time, the new techniques promised a potentially significant expansion of the ability to measure responses to temporal and dynamic shifts. [40]

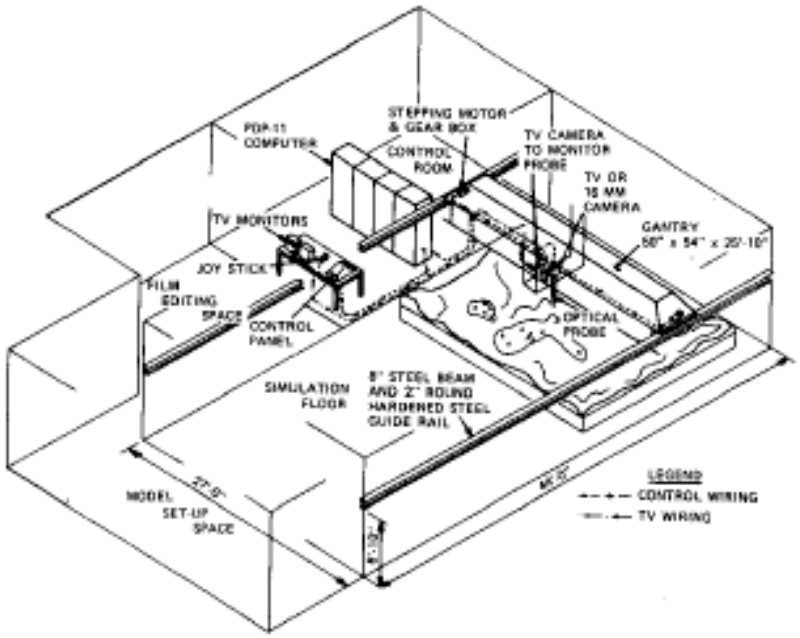

Figure 5. Schematic drawing of Berkeley Environmental Simulation Laboratory

> The Berkeley simulator should be a step toward a better understanding of reality in two respects—first, it will provide *eye-level views* of future environments, and, second, it can provide multiple and sequential views of these environments.[41]

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[39] "The diameter of the optical probe at its lower end determines the minimal model-scale through which the simulator can be 'driven.' At 1"=30' the probe would have to be of less than a .4-inch diameter in order to center on a 12-foot wide traffic lane. The actual probe used in the Berkeley simulator is of a .5-inch diameter for its lower-most 6 inches. It has a 60-degree horizontal angle of view and a 45-degree vertical angle of view." (McKechnie, 1976, 175)

[41] Appleyard and Craik, 1974, 122.

Over the course of two years, 1,043 research subjects were engaged by the researchers in a series of tests designed to test the ecological validity[42] of the Berkeley simulator. The subjects were divided into four groups, each subject to its own experimental conditions:

> some subjects took a ride along the tour in American sedans driven by project staff. Others saw a color film made from an automobile driven through the real environment. Still others saw a color film of the model made on the simulator. A final group saw a videotape of the model made on the simulator.[43]

After more than a year of rigorous data analysis, researchers came to the understandingthat "it is possible to predict real-world responses of observers who see the Berkeley simulation laboratory materials with very high accuracy."[44] Correlations between mean descriptions—registered by the respondents via Q-sort[45] and adjective checklist descriptions—of the real-world automobile ride versus the film or video simulation were very high—"typically above .90."[46] Further buttressing the validity of the results from the Berkeley simulation is the extraordinary amount of oversight exercised over the project by parties ranging from Federal oversight agencies—enforcing the "full disclosure" requirements of 1969's National Environmental Policy Act—to various review boards associated with the University of California at Berkeley. McKechnie notes that he

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[42] See Brunswick, 1956.
[43] McKechnie, 1976, 184.
[44] Ib. at 185.
[45] For details on the Q-sort method, see Pitt and Zube in *Our National Landscape* (1979)
[46] McKechnie, 1976, 185.

> can think of no other instance in the history of psychology as an experimental science in which such considerable amounts of time, energy and research funds have been invested to evaluate systematically the validity of a laboratory technique.[47]

It is important to note, however, that further research—and continued validation efforts—are necessary. The Berkeley simulation work was restricted to a specific environment—the models were all fashioned after sections of the greater Bay Area—and thus represent

> but a first step in the full validation process. The present study leaves unevaluated the adequacy of the simulation technique in representing downtown urban areas or exclusively rural areas or—for that matter—in representing features of landscape morphology and vegetation types other than those that were salient in the Terra Linda site. Even though the site was chosen in part because of the heterogeneity of land use and its complement of both indigenous and nonnative flora, the possibility exists that various interactive and/or threshold effects operate in the site to limit the generalizability of the validation findings to other environments.[48]

In order to represent previously untested landscape morphology and vegetation, close attention must be paid to the material techniques involved in creating the simulated environments." It is at this juncture that the significance of McKechnie's observation that simulation is both theoretical and applied becomes clear:

> During the process of fabricating trees, fences, houses, and autos, and later in dressing the model, the model maker is constantly confronted with the question: Will it look right through the optical probe of the simulator? In one sense, then, the model maker may be an important arbiter of validity at the

[47] McKechnie, 1976, 185.
[48] Ib. at 186.

> molecular scale. Indeed, it may be upon his or her judgments and decisions that the entire enterprise stands.[49]

The author is confident that "refinement of the model-making technique and further development of the simulation apparatus *per se* will occur as current data analyses are digested" and new models are created and analysis of their results performed.

> To some extent it may be possible to record the fabrication specifics of successful techniques (e.g. for a live oak tree or a particular type of fence) and to document the process of discriminating adequate from inadequate solutions. In fact, many of the data analyses currently under way for the Terra Linda site will, to some extent, permit this sort of fine-grain analysis of the model-making technique. However, given the great number of such objects and such decisions in the typical model, and their often highly specific nature, it ultimately may be most cost-effective to regard model-making as an art rather than a science and to seek out and employ qualified practitioners.[50]

It is precisely in the area of craftsmanship and material ingenuity that Loutherbourg's Eidophusikon project distinguishes itself and offers specific guidance to the environmental social scientist. With his keen eye for topography; his flair for theatrical illusionism; and his proficiency in representing what Gombrich calls "the ambiguity of the third dimension," Loutherbourg was perfectly suited for the objective to which he committed himself: the fabrication of more effective and realistic landscape simulations.

Alsatian by birth, Loutherbourg received early training in mathematics, though it soon became clear that his real talent was artistic, and he moved as

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[49] Ibid.
[50] Ibid.

a young man to Paris where he took an apprenticeship in an engraving academy— learning the trade and making careful study of his instructor's cache of antique engravings. During his travels he developed an interest in topography and an eye for the vagaries of relief. Though he appears to have never taken the well-trod artists' tour of Italy, he did roam the English countryside and spent weeks at a time engaged in sketching landscape profiles.

> (He) traveled widely in England. From his travels he brought back a vast number of topographical sketches, executed in his characteristic sepia or Indian ink wash, with pen, quickly outlining the objects. These he very often annotated, either with a reference to their location, or with some specific abbreviation concerning the colouring.[51]

He explored the Lake District, following William Gilpin's itinerary, and even published a touring guide of his own entitled *The Romantic and Picturesque Scenery of England and Wales* that met with some commercial success. He was well familiar with Gilpin's treatises on picturesque beauty, and the Lake District allowed him to see firsthand the vistas that had inspired them. Additionally, he was able to hone his craft specifically to the task of simulating the effects of the picturesque for an urban viewer.

> The Lake District with its variety of mountains and lakes exemplified the "Theory of the Picturesque." Lakes and mountains, brought into a proportionate relationship and an estimated balance of distance and proximity, light and shade, were regarded as the epitome of picturesque beauty in landscape. Translated into painting, this theory primarily meant a selection of landscape elements in various spatial depths, and the removal of inappropriate and discordant details, and the softening of harsh lines and tints. This prescription and these

[51] Joppien, 1973,

> devices were designed to heighten the dignity and the contemplative value of a scene.[52]

It was in the English theater that Loutherbourg made his reputation, and it was there that he also began to perfect textural techniques for the dimensional simulation of natural effects. He explored spatial depths in his design work—exploiting the full measure of the stage's ability to suggest extent and size-distance relationships. In contradistinction with much of the landscape simulation of his contemporaries, Loutherbourg added three-dimensional—often organic—elements to his tableaux. In appropriating substances gathered from natural sources and breaking with the tradition of simple, painted backdrops, he took the important step of retaining the dimensionality of the source material he reproduced.

> By breaking up wings, flats and borders into a number of smaller pieces, he was able to create an illusion of depth and distance. To enhance this he made use of adaptable sets and so-called raking pieces, as well as cut-out and broken flats, and with the assistance of proper lighting, he was able to create the illusion of infinite recession. With these varying spatial elements, Loutherbourg overcame the rigid axiality which had previously dominated the English stage. So far as landscape scenery was concerned, which was the most frequently used, the new practice aimed at creating diversity and natural irregularity. Heavy and dark objects like trees, rocks, or parts of structures, framed a recession made by forests, lakes, or sloping hills, only to be completed with an ideal or topographical vista.[53]

Having achieved wide popularity with his groundbreaking, naturalistic designs for performances of works like *The Maid of the Oaks* and the tropically-themed *Omai* (Figure 9), Loutherbourg began to experiment with

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[52] Joppien, 1973,
[53] Joppien, 1973,

theatrical arrangements in which décor took precedence over drama. The first such installation was the mysteriously illuminated Christmas performance, commissioned by millionaire William Beckford, held at the private estate Fonthill. Taking over the rooms of the estate, Loutherbourg focused upon the creation of a mood rather than on sustained narrative development. He created "a mysterious something—a something the eye has not yet seen or heart of man conceived,"[54] which consisted primarily of setting arrangements of lights, filters and fabrics to effect a "soft and tempered radiance."[55]

> Whilst the wretched world without lay dark and bleak and howling, whilst the storm was raging against our massive walls and the snow drifting in clouds, the very air of summer seemed playing around us—the choir of low-toned melodious voices continued to soothe our ear, and that every sense might in turn receive its blandishment, tables covered with delicious viands and fragrant flowers glided forth, by the aid of a mechanism at stated intervals, from the richly draped and amply curtained recesses of the enchanted precincts.[56]

Around the same time, Loutherbourg unveiled the first version of the Eidophusikon in his own home. The apparatus was the next step beyond his theatrical work; a successful condensation of the effects of the Fonthill performance; and one of the first efforts toward creating a discrete environmental simulation setting. The viewer entered an enclosed salon—with subdued décor and a dim lighting scheme—and took a seat on a cushioned bench. In front of the bench was a framed opening—resembling "a

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[54] Gage, 1963, 333.
[55] Ibid.
[56] Ibid.

giant peepshow box as much as a proscenium arch theater" [57]—two meters wide, one meter high, and about two-and-a-half meters in depth. The Eidophusikon was a mechanism for representing scenes from nature that was both dynamic and capable of suggesting the passage of time. "By adding progressive motion to accurate resemblance," Loutherbourg wrote, "a series of incidents (were) produced from nature."[58]

From his days in the theater he brought an expertise with kinetic models and a sophisticated sense of luminant effect. For this new creation, he brought his various techniques of showmanship together in a single housing in which—by means of "magic lantern slides, coloured silk filters, clockwork automata, and a sophisticated sound system—he exhibited five natural wonders at moments of change and transition."[59]

> The opening subject of the Eidophusikon represented the view from the summit of One-tree Hill, in Greenwich Park, looking up the Thames to the Metropolis; on one side, conspicuous upon its picturesque eminence, stood aside Flamstead House; and below, on way on the right, the grand mass of building, Greenwich Hospital, with its imposing cupolas, cut out of pasteboard, and painted with architectural correctness. The large groups of trees formed another division, behind which were the towns of Greenwich and Deptford, with the shore on each side stretching to the Metropolis, which was seen in its vast extent, from Chelsea to Poplar. Behind were the hills of Hempstead, Highgate, and Harrow; and the intermediate space was occupied by the flat stage, as the pool or port of London, crowded with shipping, each mass of which being cut out of pasteboard, and receding in size by the perspective of their distance. The healthy appearance of the foreground was constructed of cork, broken into the rugged and picturesque

[57] McCalman, 346.
[58] Quoted in Wilson, 65.
[59] McCalman, 346.

> forms of a sand-pit, covered with minute mosses and lichens, producing a captivating effect, amounting indeed to reality.[60]

Utilizing a number of illumination sources—variable in both position and lumen output—Loutherbourg was able to create lighting schemes far more sophisticated than the Berkeley laboratory. He devised "a remarkable silk-screen pivot which permitted him to vary the hue, intensity, and direction of his light" as well as a technique for representing moonlight that consisted of "a powerful argand lamp" held fast in a small tin box with an aperture drilled into it, one inch in diameter. Contrivances of this sort enabled simulations suggestive not only of spatial arrangements and variable perspective—but also adjustments in temporality.

> Before the line of brilliant lamps, on the stage of the Eidophusikon, were slips of stained glass; yellow, red, green, purple, and blue: by the shifting of which, the painter could throw a tint upon the scenery, compatible with the time of day which he represented, and by a single slip, or their combinations, could produce a magical effect[61]

It has been a consistent hope of environmental social scientists to find some method of simulating the passage of time in a controlled laboratory setting, as Appleyard notes:

> Another difficult problem for "realistic" simulation is that of time compaction. In brief presentations of under an hour, for instance, is it possible to simulate 20 years of experience? Drama, novels, and the movies manage to do this using dramatic license, but can time be compacted in any systematic or credible way to simulate a real-world history? Experiments are needed to see whether the repeated simulation of a project

[60] Quoted in Allen, 1960, 308-9.
[61] Allen, 1960, 320.

> or animated movies showing change over time have any similarity to an actual evolutionary experience.[62]

Having devoted a good portion of his working life to precisely such experiments, Loutherbourg fashioned an apparatus capable of accurately rendering (or distorting, depending on the purpose) circadian and seasonal rhythms and the subtlest variances in meteorological conditions.[63]

> In the distribution of light and shade, in accordance with a specific hour of day, Loutherbourg succeeded in heightening the sense of reality. The importance of light and weather in his painting is underlined by Loutherbourg's several representations of the four times of day. By inviting the spectator to observe various states of light, weather and climate in a picture, painting gave an education to the senses in looking at nature itself.[64]

In moving forward, it will be instructive to appraise the comparative efficacy of various techniques for simulating environmental features. In the case of Loutherbourg we can, for example, contrast his simulations with those of other researchers who constructed representations of the same landscape features. Niagara Falls is one such instance—and one where the dynamic nature of Loutherbourg's simulations may be of particular utility and thereby distinguish themselves from other presentation methodologies. In the 1970's, as part of a multi-agency study of the aesthetics of the American side of

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[62] Appleyard, 1977, 59.

[63] To be certain, a deft and subtle touch is necessary in any efforts to effect meteorological simulations of the sort Loutherbourg developed. Edmund Kean, a protégé and imitator of Loutherbourg's, attempted to create a Loutherbourgian tempest for his own production of *King Lear*, but the heavy weather effects were so clamorous and so realistic that not only was all dialogue in the scene rendered inaudible, but the audience developed more sympathy for the gale than the actors, and "the storm carried away the greater part of the applause." (Allen, 16)

[64] Joppien, 1973, 14.

Niagara Falls—occasioned by a series of significant rock-falls that served to gradually alter its aesthetic profile—researchers were asked to perform a series of scenic assessments of the area.[65] They recommended three possible scenic enhancements to mitigate the effects of the resultant erosion and talus accumulation. To facilitate the conceptualization of their recommendations, a hydrological model of the falls was constructed—at a scale of 1/50 and measuring twenty-two feet long and four feet high—dynamic enough to allow for the display of variations in gradient flow, pool level, and fragment agglomeration. The model was then photographed at various stages and in various configurations, in order to be presented as a series of two-dimensional images, juxtaposed with images from the field.

> To expand opportunities for the public to contribute to the decision-making process, a twelve-page brochure was published illustrating the three alternatives, with photos of the model and the actual falls.[66]

As it happens, Loutherbourg fashioned his own version of the Niagara Falls and presented it to the public as a three-dimensional, dynamic mechanism rather than a two dimensional image of the model. The accuracy and convincing nature of his representation are suggested by a review of the demonstration published in *European* magazine:

> From the top of the fall the river is beheld diminishing to an inconceivable distance; the cataract tumbles down with several obstructions, over all which it rolls, and is met near the bottom by the spungy foam it raises; whilst on the right hand, a torrent bursts, with rushing noise, and joins the foam beneath.[67]

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[65] See Zube, 1980, for details.
[66] Ib. at 92.
[67] Quoted in Allen, 1960, 312.

Loutherbourg's simulations were not tested for ecological validity *per se*, though anecdotal evidence abounds. Importantly for research purposes, not only did viewers understand the simulations as accurate, they were apprehended under conditions in which outside sensory disturbances were prevented from intruding into the simulation plane. Loutherbourg's advances in this realm are vital to understanding and surmounting the potential pitfalls involved in creating an imperforate, uncompromised sensory test environment.

> What was fundamentally different between the Eidophusikon and the theaters of the time was that it abolished the apron stage. In a scheme which endeavored to create the utmost illusion, the apron stage had no function. Without any distractions from the décor, common in the large play-houses, the spectator could concentrate solely on the illuminated picture opening.[68]

The full occlusion of outside stimulus is attested to by this reminiscence of the Fonthill creation—recorded some years after the fact:

> I still feel warmed and irradiated by the recollections of that strange, necromantic light which Loutherbourg has thrown over what absolutely appeared a realm of Fairy, or rather, perhaps a Demon Temple deep beneath the earth, set apart for tremendous mysteries—and yet how soft, how genial was this quiet light. Whilst the wretched world without lay dark and bleak and howling, whilst the storm was raging against our massive walls and the snow drifting in clouds, the very air of summer seemed playing around us…[69]

Though dynamic, both the Berkeley simulation lab—and the similarly conceived Landscape Immersion Laboratory at the University of British Columbia—involve processes by which topographically dimensional data is

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[68] Joppien, 1973,
[69] Gage, 1963, 333.

flattened and rendered two dimensional for the purpose of analysis. The Eidophusikon is unique in that it retains the dimensionality of the originary stimulus.

The Eidophusikon, then, provides not only a model for a discrete simulation setting—but by operating in three dimensions—provides a glimpse of the sort of specific textural and temporal effects that can be combined to create simulations that are at once broadly generalizable in terms of affect, and at the same time capable of rendering dynamic models of a sophistication not yet seen in environmental social science. Available evidence suggests that

> the most realistic simulations, those that have the greatest similitude with the landscapes they represent, provide the most valid and reliable responses.[70]

Additionally, from the researcher's perspective, scale modeling has the advantage of amenability to participatory methods and skill-sharing—something that two-dimensional methodologies, whether based in drafting or computer programming, lack. With a modicum of training a researcher using modeling materials can create symbolic elements that function at a very high level in terms of legibility and fidelity to the feature being simulated; issues of perspective, for instance, are minimized. Norman Geddes understood this as one of the primary advantages of scale modeling "over a cartoon method." The technique

[70] Zube, Simcox, and Law, 1987, 63.

> Requires very few skilled men. Anyone who has done work with their hands can learn to do one single specialty contributing to this work within a month's time.[71]

In combining relative ease of construction with a greatly expanded ability to render simulacra accurately, three-dimensional models appear to have much to offer researchers who hope to characterize, elucidate, and experimentalize the landscape features that serve as variables in the psychological preference literature.

Pyne's impression of the Eidophusikon's ability to render fine-grain suggestions of time and light gives a sense of what the future might hold for environmental modeling:

> The scene, on the rising of the curtain, was enveloped in that mysterious light which is the precursor of daybreak, so true to nature, that the imagination of the spectator sniffed the sweet breath of morn. A faint light appeared along the horizon; the scene assumed a vapourish tint of grey; presently a gleam of saffron, changing to the pure varieties that tinge the fleecy clouds that pass away in morning mist; the pictures brightened by trees and the projections of the lofty buildings and burnishing the vanes upon the cupolas; when the whole scene burst upon the eye in the gorgeous splendor of a beauteous day.[72]

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[71] Bel Geddes memo of September 14, 1955. Geddes archive at the Harry Ransom Center.
[72] Allen, 1966, 14.

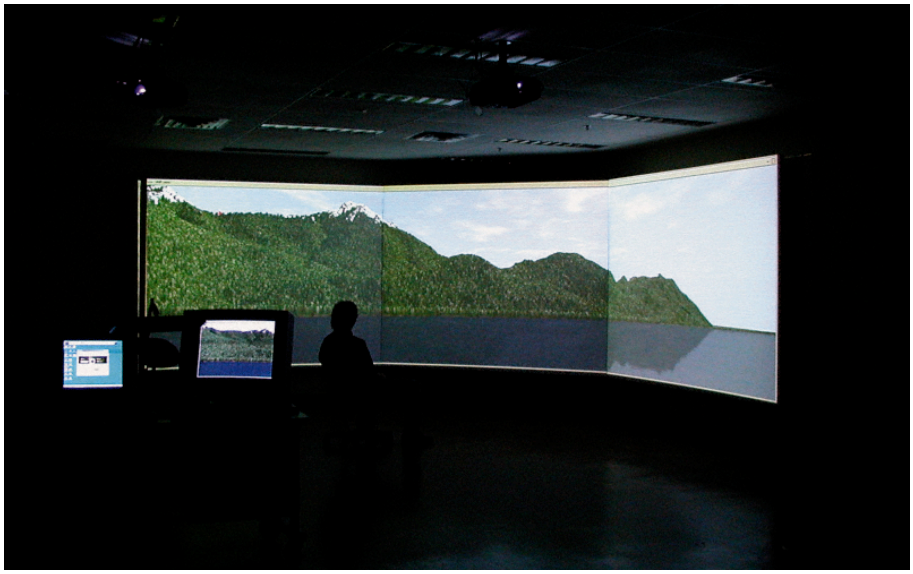

Figure 6. The Landscape Immersion Laboratory
Collaborative for Advanced Landscape Planning at the University of British Columbia

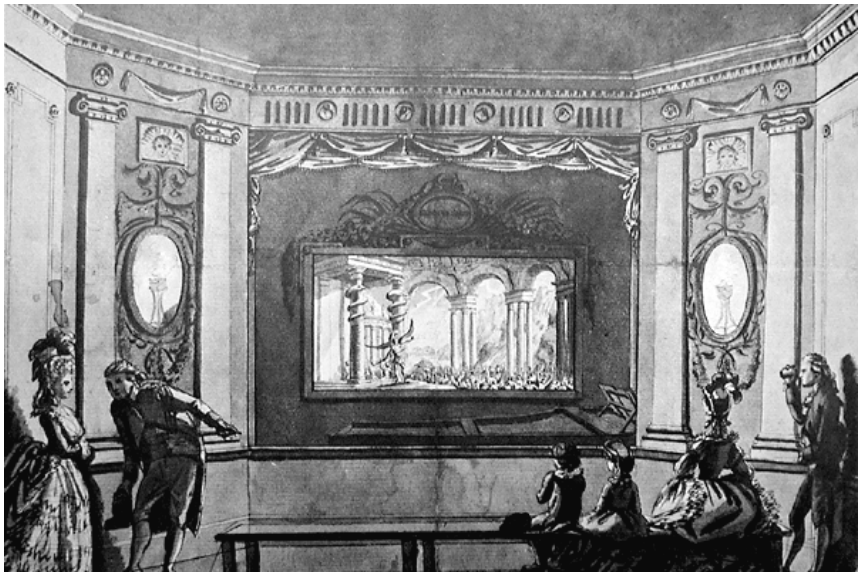

Figure 7. Loutherbourg's Eidophusikon (Watercolor by Edward Francis Burney)

Figure 8. Computer-generated landscape presentation
Harvard Design School

Figure 9. Loutherbourg's model for "Omai, or, A Trip Around the World"
Theater Royal, Covent Garden

The mechanism's multifaceted simulation capabilities—such as the means to indicate subtle gradations in luminosity—make it amenable to the extension and expansion of research previously done using less sophisticated stimulus substitutes, or variables formatted in verbal rather than visual form. Stamps' research, for example, draws upon permeability theory to underscore the importance of light, occlusion, and depth of view in respondent judgments of Mystery.[73] It is Stamps' contention that "mystery is related to preference because mystery indicates compromised perception"[74] and experimental test conditions should be capable of representing all manner of light and occlusion effects. The author's focus is on specific methods tailored to "create mysterious environments," and he encourages future researchers to "attempt replication of the relationship between mystery and amount of light in other venues and at other ranges of light."[75] This is precisely the sort of ongoing research—touching on not only questions of perception, but also more general issues of simulation validity—that new test equipment based on the dynamic, dimensional Eidophusikon would be ideally suited for.

Dynamic simulation modeling remains under-analyzed with very few comprehensive surveys of the materials and techniques available. As Zube, Simcox, and Law write: "it is remarkable that so little is known about a topic

[73] Stamps, 2007, 166.
[74] Ib. at 167.
[75] Ib. at 186.

so central to landscape architecture and other design professions."[76] That said, the judicious and sophisticated combination of the texts and models from the past might allow us to come closer to the ideal expressed by McKechnie:

> The utilization of environmental simulation in environmental psychology will permit experimentally oriented psychologists to manipulate—in a systematic manner—perceptually accurate and ecologically valid molar environments. To some extent, the development and validation of the simulation technique allow the psychologist to surmount both the limitations of external validity associated with laboratory-based experimental techniques and the internal validity threats inherent in field research. To the extent that it achieves those ends, it represents a rapprochement between the experimental and ecological sciences of psychology.[77]

[76] Zube, Simcox, and Law, 1987, 63.
[77] McKechnie, 1976, 187.

prefabricated history

In the darkest years of the depression, a stage designer named Norman Geddes published a book called *Horizons*, an illustrated collection of speculative industrial design and exhortations to speed and progress.[1] The author was convinced that historians would look back on the nineteen-thirties as a period of deep spiritual reinvigoration "in the midst of a world-wide melancholy."[2] The book featured designs for automobiles, ships, and factories—all designed for maximum efficiency and streamlining.

As a very young man, Geddes had taken a room in a boarding house where he was befriended by a fellow tenant, Olive MacGurn. At night she read plays to him—he was mesmerized by Ibsen's *Ghosts*—and cultivated his interest in the theater. In his bedroom he began to construct a small model set, fed by dry cell batteries and lit by flashlight bulbs in cardboard tubes. A geared counterweight caused a tiny curtain to fall or rise in front of the proscenium. Geddes spent endless nights dreaming up new lighting techniques for the stage, forging in miniature a new method for dimensional staging. "By trial and error, rebuilding over and over, I had my one-by-two foot stage wired within two months."[3]

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[1] I owe a great debt to Helen Adair of the Ransom Center at the University of Texas where Geddes' archives are housed. Ms. Adair was enormously helpful, hospitable and understanding during my stay in Austin.
[2] Bel Geddes (1932), 3.
[3] Bel Geddes (1960), 136.

> In those days all special atmospheric effects, even shadows, were painted on scenery. The projection of a beam of light to cast a shadow was unheard of. There were only footlights, borderlights suspended over the stage, and bunch lights from the sides. The bulbs were regular thirty-watt size which spread their light evenly,a and the result was flat illumination without any luminous quality.[4]

Geddes designed advertising posters for car companies by day, and spent his evenings at the theater or plotting his latest miniature production. "I was rapidly tiring of automobiles,"[5] he wrote.

There were many disappointing years before he was at last able to work regularly as a production designer. At the close of another in a series of early failed meetings, the famed theater impresario J.J Schubert accidentally crushed Bel Geddes' model underfoot.

After reading Dante's *Divina Commedia* in a single sitting, Geddes set to designing a model for a production of the work that was to suggest a "never ceasing movement round and round"[6] upon a giant circular stage, composed entirely of steps—with the gyre, or hell-pit, in the center. The production was to have suggested the progression of the narrative by changes in lighting. His plan

> To create the visual effects Geddes required, lights would have to be placed at a number of places over, under, and around the circular stage. His plot called for a variety of angles and sources: up light emanating from the hell-pit; a multitude of cross/side lights from very low angles to create light in

[4] Ib. at 135.
[5] Ib. at 131.
[6] Russell, 39.

> horizontal beams cutting across the endless steps and the vertical towers; higher cross/side lights defining shapes and areas in light and shadow—chiaroscuro patterns falling across the stage area; front-light capable of blazing across the stage in a wash which seemed to make the hell-pit disappear; down-light to define the levels, and as spotted down 'specials;' and back-light to set the whole stage in strong profile as well as dazzle the audience with straight-on beams.[7]

He hoped to utilize artificial smoke, in conjunction with the lighting effects "to increase the feeling of space" and gradually amplify the amount of light over the course of the first act until "the entire stage and auditorium are included in the whirling, nebulous glow"[8] As the amount of light increased, the nature its sources were to become less clear:

> As the Inferno episode progresses, the movement becomes more confused, and the beating of the vermillion light accentuates the identical rhythm in the sound.[9]

The onstage chorus was to reach the climax of Canto XXXV and then, as the singing ended, the stage was to return to darkness.

With his theater work, Geddes created encompassing atmospheres, influenced by the theater of the ancient Greeks: He felt that it was the destiny of theater architecture to break away from the proscenium formula and embrace dimensionality. In 1924 he designed a production of *The Miracle* for Max Reinhardt in New York City. When audiences entered the theater, it was as if they were seated in the dim nave of a church. Seats had been replaced by pews and the primary source of light came from 1000-watt bunch lights

[7] Ib. at 40.
[8] Ib. at 42.
[9] Quoted in Russell, 43.

placed behind stretched muslin painted to resemble stained glass windows. Electric candles were placed at the altar, and ultraviolet lights were hung above the stage to be lit periodically and create a glowing effect in interaction with specially pigmented costumes and props. 800 low-watt lamps were "fixed in a gossamer wire matrix which could, at different times, suggest both stars and fireflies."[10] His stated aim was that the audience understand themselves as taking part in a religious rite instead of a theatrical show. The devotional effect was encouraged—and some of the stage light provided—by the actors carrying battery-operated candles as they moved about the set.

He took his theatrical experiments into his father-in-law's back yard. "I turned part of his fine lawn into a miniature golf course," he wrote to a friend. "It utilized such natural hazards as the house, garage, trees, shrubbery, and sidewalks."[11] His chief hobby, however, was naval and military strategy. To this end, he created a giant map-based war game in his midtown office to which business and military leaders would flock once a week to try their hands at miniature world domination. Geddes built a terrain model out of cork— twenty feet by four feet—with tacks used to represent the various military units available. The game was played by thirty-eight people at once and "some twelve thousand tacks were present on the board at all times."[12] Though he conceived of the game during the First World War, Geddes lived to see some of its inventions made real during the Second; on the basis of the

[10] Russell, 53.
[11] Bel Geddes (1960), 154.
[12] Ib. at 231.

game he was named an honorary member of the U.S. Coast Guard's artillery association. Among those who played were journalists, military higher-ups, chess champions, and a well-known underwear mogul. Geddes remarked that "this was one kind of war in which a sensitive intellectual could really take interest."[13]

The game had a sophisticated sense of time and terrain and play often hinged upon the calculus of their interrelation. The level of contour and roughness of the playing surface were factored into the rules—causing the participants' tacks to advance more slowly in some places. "It fascinated players of board games," Geddes wrote, "Because it introduced the third dimension."

> Every evening of play encompassed three and a half days of war, each half hour being the equivalent of half a day. Time was of the essence. An electric clock, which I built myself back in 1919 before any were commercially available, was rigged to tap a ball at ten-minute intervals, and on the twenty-fifth minute there would be three short taps. On the half-hour a gong sounded sharply.[14]

The New York Sun called it "a bird's-eye view of modern warfare for players who can see like birds and reason like mathematicians."[15] A single game could last more than two years.

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[13] Ib. at 234.
[14] Ib. at 231-2.
[15] Quoted in Bel Geddes (1960), 233.

Geddes' writing is most exultant when describing the virtues of scale models. Over the years he perfected a form of photography called the BG Process that involved the painstaking construction of tiny scenes that appeared, when photographed, to be life-size. "Especially built models are assembled on a stage—illuminated dramatically—and photographed from the most advantageous angles."[16] During the forties, he was contracted by *Life* magazine to create photographs of battles to illustrate their war coverage. He made model scenes of recent engagements, and also scenes of battles that *Life* felt were likely to take place. There were indeed models for which there were never battles.

Geddes remained in the realm of models and miniature décor even after he became famous. For a relentless self-promoter, there is a fragility to his most affecting work. He lobbied the Museum of Modern Art to put on an exhibition of his war models, and it did so, but he seems to have prevailed upon its directors to mount the show against their better judgment. Members of the museum staff inspected Geddes' short accompanying soundtrack for the exhibit, "anxious," wrote one, "that it not plug *Life* too much."[17] They chastised him in a letter for sending out his own invitations to the show's opening night.

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[16] Bel Geddes (1952-58).
[17] Museum of Modern Art (1944). Archival exhibition notes, Box 250.

Futurama, his most celebrated production, was a scale model of an imagined United States twenty years in the future. Created for the General Motors exhibit at the 1939-40 World's Fair, it was 35,000 square feet, criss-crossed by "magic motorways," and rendered expertly to the smallest detail. Tens of thousands of visitors a day waited in line to board the traveling sound chairs—"upholstery to be of the best grade mohair throughout"[18]—that moved them around the exhibit while whispering in their ears. In their snug compartments modeled after private opera boxes they passed over cities and small towns, farms and mountain ranges. "Here is a prosperous and thriving steel town," the voice murmured, "With efficient and safe access to all advantages within driving distance. In the foreground is a model airport. Notice the glowing Bessemer furnaces…"[19]

The 140-ton "spectator conveyor system" carried visitors through the model at less than two feet per second. Each sound car transported its occupants for an entire third of a mile, rising and falling in elevation, following a gently curving path. Geddes envisioned the mechanics of the conveyance system and a team of engineers from the Westinghouse Elevator Company was able to realize it though nothing of the sort had ever been built before. Geddes considered dubbing it the *mobilounge*, "since in reality the device is a luxurious, traveling lounge, equipped with its 600 uniquely designed easy

[18] Bel Geddes (1938c), 1.
[19] General Motors (1940)

chairs."[20] Over the course of some 15 minutes, a visitor would travel a represented distance of about a thousand miles.

After a successful test run of the system, General Motors issued a press release for the weekend newspapers on April 14, 1939: "The opportunity to relax in comfort, still keep moving and at the same time witness a spectacular dramatization of the world of the future is expected to have wide appeal…"[21]

For the sound component, Geddes had first imagined a bone conduction system, whereby a reverberating sound unit would be built into the chairs in such a position that it came into contact with the major bone structure of each seated spectator. After extended discussion with his team of engineers and electricians, he was dissuaded from this idea.

The scale of the model below the chairs varied from 1"-20' to 1"-200'. Some buildings were hardly an inch high, while others were nearly ten feet. Additionally, the elevation of the chair above the model was subject to change—giving a spectator the sense of altitude change, as on an escalator. Certain sections were designed for leisurely viewing, like a mountain descent, while others took up very little of the floor plan and were passed by rather quickly. When one considers that the speed of the ride could also be altered,

[20] Bel Geddes (1939), 3.
[21] Ibid.

the suppleness of this gigantic system becomes apparent; it was capable of evoking very subtle changes in one's sense of scale, proportion, and time. "The speed of the conveyor system will vary from time to time in accordance with traffic demand," he wrote, in a discussion of Futurama's synchronized sound set-up.

> In other words, if the visitors are not heavily lined up, the conveyor system will be slowed down so that the entire trip will consume approximately fifteen minutes, thus enabling spectators to view the exhibit a little more thoroughly and completely, whereas if the line of spectators is very heavy, the speed of the conveyor system will be speeded up so that only ten minutes will be consumed in the entire journey.[22]

After boarding a sound chair from a moving sidewalk, a rider was removed into semi-darkness and a narration began from a speaker at his shoulder. Gradually, an "introductory landscape" appears in the distance—farm country in the golden afternoon. "As soon as the spectator becomes accustomed to the model and its scale and adjusts himself to the window, he takes in the beauty and completeness of the detail."[23] He is in 1960 now—"for the entire ride he will live in that future"[24]—though he may not sense it at first because the bucolic opening tableaux has a timeless feel.

He will follow the cars and trucks from the rural lanes to secondary roads that will eventually link up with a large highway. Before him are seven lanes of motorway—the entire model featured 50,000 cars, 10,000 of which

[22] Bel Geddes (1938?), 1.
[23] Bel Geddes (1938?b), 1.
[24] Ib. at 2.

moved—in unfamiliar traffic patterns, giant feeder planes, transition points, and stacked, knotted clover leaves: “An entirely new type of right-of-way.”[25] In the distance is an experimental farm, distinct from the earlier sort—“glass vats filled with green chemicals gleam in the sunlight.”[26] The sound chair moves on and the occupant sees a college town nestled in the hills. “The time is now approaching late afternoon, and the shadows lengthen.” The highway intersects with another, and the terrain grows rougher and more irregular again. “Lights from the farms begin to twinkle in the gathering dusk.”[27]

Hydroelectric dams and large factories appear periodically throughout the ride—glowing with miniature lights, shrouded in mist or steam emitted from tubes hidden in the model. The voice from the speaker reminds the rider that these systems provide power and light to the surrounds, even while the residents sleep. He feels tiny clouds of vapor against face and the undisturbed hum and throb of the ride’s machinery sends vibrations throughout his body. His sound car rises up and directs his gaze toward the distant horizon.

Night falls and the rider sees a signal tower flashing near the airport. An amusement park at the edge of town glows in the darkness and he can faintly hear sounds from the fairway and carousel. The highway he has been

[25] Ib. at 4.
[26] Ib. at 6.
[27] Ib. at 8.

following curves off and away into the distance. The sound car disappears briefly into a tunnel dug into the mountains. Inside, "the spectator sees a flood-lighted quarry, where night work is being done, and the cranes are picked out by illumination against the white stone surface."[28] Both the tunnel and various rocky outcroppings made of plaster are used to enable transitions between the segments of the ride.

When the rider emerges from behind the crags, he is closer to the model, afforded a better view of the highway hugging the edge of a cliff as it ascends into the mountains. "Great spruce trees bank the rocky ledges, tall and proud in the moonlight."[29] He is so near the road that he can now hear the sound of rushing traffic as the drivers hurtle through the night.

One driver has pushed himself too hard and fallen asleep at the wheel—but the highway protects him and the divider eases him back into traffic, undamaged. Beyond, there is a bridge over a giant chasm; the sun is beginning to rise and the rider sees a valley far below in the distance. "Down at the bottom of the gorge, the liquid roar of a river can be heard…The sky is the thin, pale color of dawn and the flaming edge of the rising sun is just appearing in the distant mountains on the horizon."[30]

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[28] Ib. at 10.
[29] Ibid.
[30] Ib. at 11.

More landscape crawls underneath; the rider sees small towns, summer cabins, lakes, and rivers—the serpentine motorway leading his eye through the various tableaux. "He is struck by the complete accord of the man-made motor route and the beauty of the territory through which it passes." The motorway eases away for a while—now about 3 miles distant.

> Just ahead appears an enormous dam holding back the headwaters of a large mountain lake. The spectator sees the spillway and flood locks and the hydro-electric power plants and companion buildings at its base. The dam is a miracle of engineering. It is set beside an enormous artificial lake and provides power for many thousands of miles around.[31]

The rider climbs back into the mountains. "A screen of trees and rock interferes with the spectator's view for an instant and then a mass of towering mountain peaks spreads before him. He is literally on top of the world."[32] He sees ski resorts and mining settlements. The sound chair rises up, above the mountains, to allow an extraordinary view of the valley below and a vast metropolis in the distance. The immensity of Geddes' labor lies spread out beneath him—fabricated from cork and celotex, "a sight to stir the soul."[33]

The ride makes its way now toward the giant city in the far distance, tall building shafts emerging from the hazy light. The sound car moves slowly toward the city, a represented distance of about 40 miles. The rider passes small towns and satellite suburban encampments. As he nears the city, he

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[31] Ib. at 15.
[32] Ib. at 16.
[33] Ib. at 17.

begins to rise again and achieve another panoramic view. Nine miles from the city center, he passes the airport and its outbuildings, then the railroad yard. A large cloud obscures his view for a moment and when he emerges from behind it he is at a lower altitude, able to make out more detail in the city of the future. It is now late afternoon and he has traveled through an entire twenty-four hours. He comes closer to a six-block section of the downtown area. Below him he sees pedestrians going about their daily business, cars moving to and fro. The sound chair strikes a soft impediment on the track and is turned round rapidly. There is a moment of semi-darkness and then he is face-to-face with the street he has just seen in miniature, constructed full-size. He can now exit the chair that has carried him over so many miles and hours and explore the mock-up boulevard.

the moderated sublime

"One of the most firmly established findings in the environmental preference literature," write Herzog and Miller in 1996, "is that mystery is positively related to preference."[1] In study after study, environments that respondents find appealing are appreciated, at least in part, because of their Mysterious qualities. In addition to the pleasing attributes, however, there is also evidence that a Mysterious environment can sometimes and in some configurations be seen as dangerous. There is an interpretational convergence, and "some of the same features known to enhance mystery, such as vegetation and concealment, may also enhance perceived danger/fear in certain situations."[2] "Mystery has been implicated," Herzog and Miller write, "as a positive contributor to both environmental preference and perceived danger/fear."[3] This relation between mystery and perceived danger is perhaps best conveyed by Lynch in his celebrated *The Image of the City*:

> It must be granted that there is some value in mystification, labyrinth or surprise in the environment. Many of us enjoy the house of mirrors and there is certain charm in the crooked street of Boston. This is so, however, only under two conditions. First, there must be no danger of losing basic form or orientation or never coming out. The surprise must occur in an overall framework; the confusions must be small regions in a visible

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[1] Herzog and Miller, 1998, 429.
[2] Ib. at 430. For corroboration, see Shaffer and Anderson (1983); Fisher and Nasar (1992); Loewen, Steel, and Suedfeld (1993); Schroeder and Anderson (1984), among others.
[3] Herzog and Miller, 1998, 429.

> whole. Furthermore, the labyrinth or mystery must in itself have some form that can be explored and in time apprehended.[4]

For Lynch, in order for a mystifying space to retain its charm it must, at root, be *legible* as an overall schema—easy for the human observor to identify its parts and structure the whole"[5]—easy to understand and remember as well as easy to find one's way within the scene and to find one's way back to the starting point. Whatever difficulties it presents in initial apprehension or orientation, it must be easily and pleasurably soluble. The iteration of *ease* is germane; we will see that legibility and facility of apprehension are vital in maintaining a satisfying aesthetic equilibrium and avoiding any drift into the realms of the genuinely hazardous.

The slippery value Lynch finds in mystification is reflected over and over again in the literature of environmental social science. "Although we view fear as a negative affective reaction," write Herzog and Miller, "this does not imply that fearful situations are not fascinating.

> Sources of fascination compel one's attention. Given the operation of natural selection, situations of danger/fear could hardly be anything other than fascinating. Such situations threaten our very survival, and thus natural selection would favor an attraction-repulsion response. This is the ambivalent nature of humans that Hebb (1972) described. Fascination attracts us up to a point; beyond that point, fear dominates and repels us. The immediacy or saliency of the danger seems to be a key variable.[6]

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[4] Lynch, 5.
[5] Ib. at 13.
[6] Herzog and Miller, 1998, 445.

We are attracted by mystery—and the landscapes that embody it—for "the promise of new information" they offer, but it is vital to our peace of mind that the environments we encounter not be wholly new, and never truly unsettling. Like Lorenz's podgy shrews, we whisker our way forward with one eye always on the safety of our nest box.

Herzog and Miller exemplify research in this area, and tackle the issue head-on in an effort to explore "the relationships among mystery, danger, and preference, as well as between them and two physical features of settings, openness and pathway curvature in urban alleys and field/forest settings containing pathways."[7]

> The implication is that mystery can contribute to both preference and fear of danger, diametrically opposed affective outcomes. The major purpose of this study was to explore that irony both conceptually and empirically.[8]

The researchers offered extra course credit to undergraduates who chose to take part in their study. Participants rated a series of 36 color slides "falling equally into two categories, urban alleys and field/forest settings containing visible pathways.

> None of the settings contained people. All settings were photographed in early summer or early fall so foliage and vegetation were primarily green, and extreme weather conditions were avoided. All slides were oriented horizontally. [9]

Participants took part in several rating sessions including one for *mystery* alone; one for *danger* alone; one for *openness* alone; one for *curvature* alone;

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[7] Herzog and Miller, 1998, 429.
[8] Ib. at 430.
[9] Ib. at 434.

and one where they were given definitions for both mystery and danger and gave each setting a rating for each category. Ratings were based upon a 5-point scale that ranged from 1 (not at all) to 5 (a great deal). The preference variable was defined as "how much you like the environment depicted, for whatever reason?" Danger was defined as "How dangerous is this environment? How likely is it that you could be harmed in this environment?" Mystery was defined as "How much do you think the environment promises more to be seen if you could walk deeper into it? Does it appear that if you entered more deeply into the environment you would learn more?"

> The order in which the two variables were rated was varied haphazardly across raters. In forced-choice sessions, participants also received definitions for both danger and mystery. They were instructed to decide for each setting "which impression is stronger: that the environment has mystery or that the environment is dangerous." They responded by writing "M" for mystery or "D" for dangerous on their response sheets for each setting. In the free-response sessions, participants received response sheets with three blank spaces for each setting. They were instructed to write in the blank spaces "three words or phrases that describe your impressions or feelings about the environment." They were encouraged to fill in all three blanks for each setting, but 42 of 104 respondents left at least one blank empty.[10]

During the test sessions, five practice slides were first offered so that participants could acclimate themselves to the process of viewing and offering feedback. "The participants responded to 38 slides, the first and last of which were fillers, intended to absorb any beginning- or end-of-set effects."[11] Each

[10] Ib. at 435.
[11] Ibid.

slide was presented for 20 seconds except in the free-response session where participants were allowed 30 seconds with each slide.

> Final sample sizes were 105 for preference, 104 for free responses, 32 for danger only, 31 for mystery only, 43 for danger and mystery…49 for the forced-choice task, 37 for openness, and 45 for curvature.[12]

The free responses were analyzed for content, with a protocol developed for danger and mystery responses. Acceptable danger responses in the blank space included *afraid*, *don't go in*, *violence*, and *infested.* Acceptable mystery responses included *want to see more*, *twisting trail*, *hidden view*, and *reaching to pull you in*. Disagreements between content analysts were resolved by negotiation.

> In the end, each respondent had two scores for each setting, the number of danger responses and the number of mystery responses, each of which could range from 0 to 3. These variables are referred to hereafter as danger-free and mystery-free.[13]

Table 1 shows the intercorrelations between the study variables based on all of the 36 settings. It is interesting to note that there is a strong negative correlation between preference and the danger measures are strongly intercorrelated with each other. Preference is positively correlated with mystery, and the mystery measures correlate with each other. Measures of danger and measures of mystery "tended to be uncorrelated with each other."[14] Free responses are highly correlated with their objective counterparts.

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[12] Ib. at 435-6.
[13] Ib. at 436.
[14] Ib. at 439.

Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1. Preference	—	.62	.02	-.92**	-.85**	-.71**	-.93**	.31	.32	.42*
2. Openness		—	.18	-.80**	-.71**	-.73**	-.57**	-.30	-.17	-.11
3. Curvature			—	-.07	-.03	-.13	-.10	.17	.37*	.09
4. Danger				—	.93**	.83**	.90**	-.01	-.09	-.25
5. Danger *with mystery*					—	.82**	.88**	.04	.06	-.20
6. Danger *free response*						—	.70**	.24	.15	.04
7. Danger *forced choice*							—	-.27	-.29	-.48**
8. Mystery								—	.85**	.68**
9. Mystery *with danger*									—	69**
10. Mystery *Forced choice*										—

Table 3. Intercorrelations Between Measured Variables for All Settings (N=36; *p<.05; **p<.01) Herzog and Miller

> Given the strong clustering of the danger and mystery variables and the relative independence of the two clusters overall, it seemed reasonable to build composite measures of danger and mystery before proceeding. However, to check our intuitions, we subjected the correlations in (Table 1) for the seven danger and mystery variables to both principal-axes factor analysis and hierarchical cluster analysis. Both types of analysis clearly revealed the two clusters…and clearly indicated that the forced choice measure belonged to the danger cluster. Our intent, then, was to build composites by separately averaging the four danger variables and the three mystery variables.[15]

Correlation among the resulting composite variables reconfirmed that danger and mystery were uncorrelated overall and for alleyways—though they *were* positively correlated for field/forest settings. "We have the field/forest category higher in preference, openness, and (marginally) mystery, alleys clearly higher in danger, and the two categories identical in perceived pathway curvature."[16] Following a step-down regression analysis—for the purpose of eliminating non-significant interactions one-by-one—the researchers were left with a final model in which all effects were significant.

> For preference, the final model consisted of the simple effects of danger, mystery, and setting category, with danger a negative predictor and mystery a positive predictor. For danger, the final model included the simple effects of mystery (a positive predictor) and setting category plus an interaction involving curvature. Curvature was a significant negative predictor of danger for alleys but did not predict danger for field/forest settings. For mystery, the final model included the simple effect of curvature (a positive predictor) and an interaction involving openness. The relationship of mystery and openness was negative for both setting categories but greater in magnitude for alleys. The simple effect of setting category was not significant in the final model of mystery.[17]

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[15] Ib. at 440.
[16] Ib. at 442.
[17] Ib. at 443.

The researchers note "the most important finding of this study is that mystery can play an ironic and paradoxical role as a positive predictor of both preference and danger in situations where the latter two variables are negatively correlated with each other."[18] In their view, the affective reaction will be dependent upon the context, with mystery instrumental to either response— preference or danger/fear. "Whichever reaction dominates," they write, "Mystery contributes in a positive way to that reaction."[19] When seeking to identify whether a setting will elicit a reaction of preference or fear, "the immediacy or saliency of the danger seems to be the key variable."[20]

So too is *immediacy* a determining factor in judgments of the sublime. Edmund Burke makes clear that what may feel appealingly renegade from a distance becomes distinctly uncomfortable when the physical stakes are raised:

> When danger or pain press too nearly, they are incapable of giving any delight, and are simply terrible; but at certain distances, and with certain modifications, they may be, and they are delightful, as we every day experience.[21]

The current movement in psychological literature regarding landscape may, in fact, be seen as a sustained iteration of the Burkean sublime, coupled with an effort to locate its causes in evolutionary biology and codify its attendant terms and categories using preference analysis. In Burke we find an allied

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[18] Ib. at 444.
[19] Ibid.
[20] Ib. at 446.
[21] Burke, 59-60.

preoccupation with the consanguinity of fear and pleasure. Like Herzog and Stamps, Burke will seek to identify the physical predictors; locate the salient boundaries; and divine the "efficient cause" of these paradoxical emotional interrelationships.

Pain, danger, and terror are, for Burke, primary sources of the sublime. "Indeed terror is in all cases whatsoever, either more openly or latently, the ruling principle of the sublime."[22] He notes that in Greek, Latin, and French the same word is often used "to signify indifferently the modes of astonishment or admiration and those of terror."[23] He will found his argument, as do Appleton, the Kaplans, and Herzog, on historical-instinctual grounds—the will to survive serving as the source for the alluring sensations of the sublime: "The sublime is an idea belonging to self-preservation.

> The passions which belong to self-preservation, turn on pain and danger; they are simply painful when their causes immediately affect us; they are delightful when we have an idea of pain and danger, without being actually in such circumstances; this delight I have not called pleasure, because it turns on pain, and because it is different enough from any positive idea of pleasure. Whatever excites this delight, I call sublime. The passions belonging to self-preservation are the strongest of all the passions.

In Burke we see an interrelationship between terror, obscurity, and power—the correct combination of which serve to induce the sublime response in a subject. There were and continue to be lengthy debates as to the precise causes and formal meaning of the sublime, especially as

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[22] Ib. at 97.
[23] Ib. at 98.

distinguished from, for example, the beautiful and the picturesque. While picturesque landscapes will typically contain uneven elements and an untrammeled, shaggy air—as in the landscapes of Uvedale Price—a sublime tableaux represents a significant raising of the psychological stakes. *Astonishment* must be a constituent element in a sublime experience, and "astonishment is that state of the soul, in which all its motions are suspended, with some degree of horror."[24]

> No passion so effectually robs the mind of all its powers of acting and reasoning as fear…whatever therefore is terrible, with regard to sight, is sublime too…for it is impossible to look on any thing as trifling, or contemptible, that may be dangerous.[25]

To amplify the effect of terror, Burke notes "obscurity seems in general to be necessary."[26]

> When we know the full extent of any danger, when we can accustom our eyes to it, a great deal of the apprehension vanishes. Every one will be sensible of this, who considers how greatly night adds to our dread…[27]

With both Mystery and the sublime, then, a primary example of a physical predictor is light. Compare Stamps:

> Light had the strongest influence on impressions of mystery. For a range of luminosity of 179 to 79, the standardized mean difference (*d*) in rated mystery was -2.15; the corresponding correlation r=-.73. A *d* of 2.1 is an effect twice the size of the visual effect of a mountain.[28]

with Burke on the same topic:

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[24] Burke, 57.
[25] Ibid.
[26] Ib. at 58.
[27] Ib. at 59.
[28] Stamps, 2007, 182.

> A quick transition from light to darkness, and from darkness to light, has yet a greater effect. But darkness is more productive of sublime ideas than light…I think then, that all edifices calculated to produce an idea of the sublime, ought rather to be dark and gloomy…[29]

In focusing upon the mystery/danger dynamic, we see the current group of researchers fruitfully revisiting Burkean aesthetic preoccupations—in this case, the interrelationship between the sublime and its correlative, fear—and locating the proximate causes in the same physical arrays and mechanisms, namely visual obscurity.

Kaplan traces the respective precincts of fear and pleasure—and their overlapping selvages—in a discussion of the recurrent human negotiation between novelty and legibility. Echoing Burke, he relates the quality of the cognitive map to the probability for survival and notes that, in such an arrangement, "one would expect humans to be both curious and fearful of the strange at the same time." [30] In an information-processing theory of landscape apprehension, man will "station himself along the shifting fringe between the known and the unknown.

> The process that feels good is the process that is most adaptive from an evolutionary point of view, that is, going along making sense out of things, anticipating, acting appropriately, and exploring new things. [31]

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[29] Burke,146-7.
[30] Kaplan, 1973, 278.
[31] Kaplan, 1973, 278.

Researchers in psychology have for some time sought to experimentalize the variables concomitant with this process—to determine the coordinates of the shifting fringe.

> We may visualize a range of perceptual input from sensory deprivation (monotony) to sensory satiation (chaos). In the case of the former, there is not enough to observe, to select, to organize; there is an excess of order. In the latter, there is too much to observe, there is no relation between the elements, so that one is overwhelmed by multiplicity.[32]

To empirically determine the left side of such a spectrum, psychologists at McGill University developed novel content settings wherein sensory input was sharply restricted.

> In these studies, the subjects' sensory intake was limited by having them lie in a bed, wearing translucent goggles, gloves, and cardboard cuffs. The room itself was quiet, except for an audible hum which served to mask any variations in the sound level.[33]

Participants in the study reported complex visual hallucinations during the period of withdrawal, and reported that the sensory aberrations continued after the experiment had concluded and they had reentered normal surroundings.

> As these findings became known to psychologists, who also noted that the sensorily deprived subjects were unanimous in expressing their active discomfort with the restrictions set up in the McGill experiments, research grew up around the question of whether complex visual stimuli would be gratifying since simple and restricted stimuli were so displeasing.[34]
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> The answer was: *to a point*. Researchers found that, indeed, test subjects consistently prefer variable and complex visual environments, but

[32] Rapoport and Kantor, 1967, 211.
[33] Rapoport and Kantor, 1967, 212.
[34] Ib. at 213.

that "this preference ceases if pushed"[35] to a point where the stimuli becomes chaotic or disorienting.

> This preference for the complex and ambiguous is not limitless…Stimuli which are too simple lead to quick boredom; those which are too complex lead to confusion and avoidance. This suggests the idea that for each person there is an optimal perceptual rate.[36]

An optimal perceptual rate is one where natural human attraction to novelty is balanced by the formidable sense of caution common to all creatures—whether shrews or humans—and amplified by eons of evolutionary struggle. Researchers seeking to locate a "consensual point of visual preference"[37] have concurrently sought the perceptual rate corresponding to it—the number of "bits of information per unit time" [38] that humans can comfortably process. While psychologists have discovered that "optimal preference is for the middle-range of arousing stimuli,"[39] it is also the case that subjects tend to prefer landscape elements that—if not precisely hazardous—have, at least, a richness of visual appearance.

> The wild and rough parts of nature produce the strongest effects on the imagination; and we may add, they are the only objects in landscape, which pleasure the picturesque eye. Everything trim, and smooth, and neat, affects it coolly.[40]

There is the danger in landscapes of pronounced visual aridity that a subject will feel unchallenged and become bored. As noted before, a truly

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[35] Ibid.
[36] Ib. at 214.
[37] Ibid.
[38] Ib. at 215.
[39] Ibid.
[40] Gilpin, *Remarks on Forest Scenery*. Quoted in Barbier, 1963, 103.

novel environment is not acceptable. Kaplan notes that the landscape should be rich and varied, but

> there must be a degree of pattern, of order, running through the variety. The arrangement of components is not random, but follows some set of rules. Coherence both facilitates recognition and makes prediction possible.[41]

This, too, is recognizable as a sustained—if circumspect—gloss on Burkean aspirations. What the environmental researchers seek—the equilibrium they endeavor to quantify and reproduce—is a landscape experience wherein the beneficial effects of sublimity are periodically iterated, with an additional codicil assuring the ultimate safety of the enterprise. While landscape design in Burke's time may have tended toward the reckless—fabricating schemas that were both physically and psychologically incautious as suggested by Andrews' description of English garden settings where

> tumultuous emotion was to be inseparable from the experience of the sublime garden: sudden terror at finding oneself emerging from a dark cave to within a few feet of a loud waterfall; giddying prospects from selected cliff-top viewpoints; the alarming obscurity of grotto passages[42]

the current group of researchers and designers have settled upon a more prudent course, with the admirably utilitarian goal of fabricating visually rich environments that are at the same time entirely harmless—landscapes manifesting what we might call the *moderated sublime*. Such a landscape is not to be conflated with the simply picturesque. If, as Hipple suggests, the picturesque "holds a middle station between beautiful and sublime,"[43] then the

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[41] Kaplan, 1973,
[42] Andrews, 1990, 323.
[43] Hipple, 200

moderated sublime can be said to occupy a further subdivision along this spectrum, between the picturesque and the unadulterated sublime. Rather than exhibiting features that are simply pleasingly ragged, the moderated sublime includes, importantly, a gesture toward the dangerous—eliciting "that frisson of terror so central to the experience of the sublime."[44] Such an environment offers a sense, simulated though it might be, that the viewer is in the presence of a perilous feature or series of features.

If we understand the testing and construction of such environments as our goal, the question arises: how to initiate the process of creating physical features and arrangements capable of summoning a sense of the moderated sublime in a viewer? In looking to create an impression of sublimity without physical liability, we naturally turn to the field of landscape architecture—with its many generations of experience fashioning environments where every breathtaking view is underwritten by some manner of scenic safety mechanism. Burke writes that the sublime is "never more perceived, nor operates with more force than when without danger we are conversant with terrible objects."[45] In designing prospective landscapes to reliably produce moderate sublimity, a designer will aim to install nodes of Burkean frisson-effect upon a subtending network of precaution.

[44] Cosgrove, 1984, 229.
[45] Burke, 50.

Toward this end, it is instructive to look at the work of Appleton, who has done more than perhaps any landscape theorist since Burke to codify the specific integrant elements of environmental preference—and who more than most of his contemporaries makes explicit his debt to the author of *A Philosophical Enquiry into the Origin of our Ideas of the Sublime and Beautiful*.

Having formulated prospect-refuge theory, Appleton draws upon the Sublime to explicate his notion of *hazard*—defined as "an incident or condition prejudicial to the attainment of comfort, safety, or survival."[46]

> Burke also realized that there was a difference between the kind of "pain" which distinguished the sublime from the Beautiful and the kind of "pain" which a creature might experience at the hands of a merciless Nature if he presumed to trifle with her. To experience the sublimity of a storm wave one does not have to plunge into it and taste the real sensation of being smashed to pieces. To stand on a cliff and be gently shaken with it, to feel the sting of the spray on the face and the clammy chill of wet cheeks, to hear the ponderous thud, something between a bang and a rumble: these will suffice. The knowledge that we can see the wave and assess its potential before it breaks, and that we can observe it from a place of safety just, perhaps only just, beyond the reach of that potential, this is what enables us to find meaning and excitement in the whole experience. Exposure to the hazard is matched by perception of the hazard and followed by refuge from it.[47]

We have seen that the prospect-refuge mechanism produces pleasure when a situation is enacted where the subject has the sensation of "seeing without being seen." Because such a vantage point has intense historico-biological significance—duplicating as it does a position favorable to

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[46] Appleton, 1975, 269.
[47] Ib. at 96.

survival—it produces in the subject a feeling of relaxation and a drop in the level of anxiety. But Appleton is at the same time surely right to say

> To 'abolish' the hazard altogether is to deprive the prospect and the refuge of their meaningful roles, since they cannot be expected to react against a stimulus which is no longer there. Burke realized, and stated very explicitly, that exposure to a sense of the power of nature, or better still to a sense of the infinite, was indispensable to the experience of the Sublime, and this is simply stating, in eighteenth century terms, that prospect symbolism and refuge symbolism also demand a hazard symbolism to make them work.[48]

Appleton defines *incident hazards* as "threats to a creature's well-being which seem to be occasioned by some external incident," and *impediment hazards* as those which do not pose a direct threat to well-being, but interfere with locomotive ability. He observes that "minor hazards may lend an air of additional satisfaction to one's relationship with the environment."[49]

> It is a general rule in the prospect-refuge situation that the creature who seeks to exploit his environment to his advantage does so by making the most effective strategic use of features which are available to his adversary as well as to himself. The prospect which enables him to see may equally well be employed by his enemy. The refuge in which he seeks cover may already contain a lethal hazard. By way of recompense, so to speak, the impediment which threatens his escape may also hamper his pursuer. It is a common assumption in military operations that the river line which may be exploited to hold back the enemy is the last kind of physical feature one would choose to have behind one, because it cuts off retreat or, as one might say, denies refuge.[50]

Here again we see evidence of the ever-shifting dynamic between pleasure and risk. Hazards are, in a very real sense, instrumental to the

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[48] Ibid.
[49] Ib. at 97.
[50] Ib. at 100.

delight we take in "seeing without being seen." Landscape architect and theorist Uvedale Price describes an ideal state occasioned by the right combination of environmental elements—echoing Appleton's: an emotional climate "midway betwixt languour and tension."[51] Understanding this, we may begin to formulate methods for artificially setting in motion the pleasure-response attendant with prospect-refuge. We wish to create environments in which mystery and/or prospect-refuge markers are retained—and their positive satisfaction outcomes preserved—while at the same time ensuring that the perceiving creature experience the very minimum in terms of risk or sense of danger. Might we effect periodic moments of astonishment and satisfaction by the judicious deployment of *mild hazards* to ensure that mystery remains as a superficial, textural presence—but never lapses into true peril or coalesces into a persistent state of discomfort? Might we engineer environments representing—and facilitating—an ideal ratio of mystery to perceived danger? Can we simultaneously deploy our understandings of landscape design, scenic assessment, and optimal perceptual rates—to create settings in which individuals are subject to a steady and predictable influx of information bits, serving to distribute mysterious landscape values in exacting proportions?

Before we proceed, we will briefly survey some of the literature that concerns itself with the transformation of landscapes to preserve variety while eliminating risk. Newman (1973) provides a careful taxonomy of hazardous

[51] Price quoted in Hipple, 206.

environments and begins to suggest methods by which we can make them less so. He offers four characteristics of *defensible space*—"a surrogate term used for the range of mechanisms—real and symbolic barriers, strongly defined areas of influence, and improved opportunities for surveillance—that combine to bring an environment under the control of its residents."[52] It is precisely mechanisms of this sort that environmental researchers hope to adapt and make more efficient in their quest for safer, easily apprehensible landscape arrangements. A defensible space, for Newman, (a) can be subdivided into perceived zones of influence so that inhabitants may assume territorial attitudes; (b) is physically arrayed so that inhabitants or their agents have expansive surveillance opportunities; (c) features mechanisms capable of neutralizing any symbolic stigma that may exist in regards to the space's isolation or vulnerability; and (d) is arrayed in such a way that areas perceived as unsafe are juxtaposed and interspersed with areas that are commonly understood to be safe.

Instrumental to Newman's conception of defensible space is the proposition that an environment should be clearly defined as to its specific use—with visual ambiguity eschewed in favor of clarity of purpose. Distinct zones of influence, subject to enclosure for common surveillance serve to divide a landscape into legible, manageable subdivisions that can be monitored closely—enabling individuals to "watch strangers more diligently

[52] Newman, 3

and clarify the range of behavior which could be defined as reasonable."[53] Visual ambiguity in regards to the function of a particular space can easily lead to ambiguity in terms of the sorts of behavior understood as tolerated in the space. In order to regulate acceptable practices, ambiguous zones should be redefined and rendered self-evident by use of "a wide range of suggestive and persuasive symbolic elements"[54] that serve to lower the threshold for the "degree of ambiguous behavior a zone will tolerate."[55] Here Newman's work dovetails neatly with the researches of Appleton and the Kaplans, for whom a reliable prospect is vital in order to "exploit the advantages latent in a creature's surroundings."[56]

In designing space that is truly defensible, it is vital that there be mechanisms for quickly identifying variation or deviance. Appleton's hunting creature positions itself in relation to a potential pursuer so that "if possible…I will perceive him threatening me while I yet have time to reach safety."[57] Similarly, for Newman, "crime control can be achieved by creating a situation in which it is possible for the potential victim to recognize in advance the potential criminal."[58] If, as Mitchell suggests, "landscape is a form of regulation,"[59] designers might catalogue features that both serve and detract from the regulatory purpose in order to deploy them as methodically as

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[53] Ib. at 166.
[54] Ib. at 64.
[55] Ib. at 65.
[56] Appleton, 1975, 70.
[57] Ibid.
[58] Newman, 1973, 18.
[59] Mitchell, 1994, 24.

possible. In initiating a modification of a space for the purpose of rendering it unassailable, the first and most exigent task is the systematic excision of the features that are visually inconclusive or persistently ambiguous. As Newman notes, "activity must have an acceptable purpose or intent; if it is unusual it is dangerous."[60]

Having firstly eliminated landscape elements of dubitable character, a designer may then begin the process of surreptitiously interpolating richness, variety, and pleasingly mysterious elements to the resultant scenic tabula rasa. Once the truly hazardous risk elements and signifiers have been eradicated, and all inconclusive elements purged, the environment can be replenished with any number of visual enhancements capable of evoking pleasure by way of the moderated sublime. There is great potential, then, not only to render perilous environments safer, but to modify innocuous environments so that they might have an 'air of mystery' about them—might appear pleasantly uncertain whilst remaining satisfyingly reliable.[61]

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[60] Newman, 1973, 66.

[61] The analysis of Herzog and others on this subject might be fruitfully linked with Bourdieu's (1988) excellent work on the maintenance of academic order through "reconversion strategies"—adaptations wherein "consecrated heretics" appear to deconstruct the foundations of their disciplines while in fact retaining prestige and consolidating disciplinary stability. Bourdieu's notion of complicit adversaries ("*des adversaires complices*")—figures who are ostensibly in disagreement, though in fact share a broader commitment to order and selectivity—has extensive parallels in the literatures of landscape architecture ("fabriques" in Moser, 1990); home and garden improvement (the use of boulders in Nash and Hughes, 1997); and psychogeography (the "minor hazards" of Appleton, 1975).

As Mitchell notes, the landscape is a site "in which what is natural and what is moral is struggled over."[62] This work, and Newman's, can be contextualized within a history of landscape practice in dialogue with landscape theory. At every juncture of the centuries-long debate, certain themes return and questions revolve around the same core issues: *intention*, *naturalness*, *disclosure*, and *the relation between landscape and morality*. Newman's observations about natural surveillance can profitably be understood as a supplement to the larger project of *naturalizing* surveillance—giving new or extant surveillance loci the outward appearance of being indigenous or enchantingly agrestal. In fact this is one of the key elements of our general methodology, and the nascent promise of Newman's work: a regimen of procedures for the administration of landscape in which the connection between the spatial and behavioral-ideological is recognized; reliable mechanisms are emplaced to encourage virtuous activity; and, lastly, a tested regimen of techniques are utilized to (a) systematically eliminate all traces of ideological effort; (b) weather and efface any physical residuum indicating the artificiality of the planning process; and (c) introduce substratal insurance architecture so that the landscape ratio structures remain intact and operating efficaciously. Prior to Newman, this naturalization process is most fully developed and synopsized by Richard Payne Knight who submits that the basic purpose of the process is to "adorn, arrange, to separate and select…with secret skill and *counterfeit neglect*."[63]

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[62] Mitchell, 1994, 24.
[63] Quoted in Hussey, 1967, 69.

We can constructively divide these techniques into three categories: *veiling*, *swarding*, and *hedging*. Each of these tactics plays a vital role in cultivating and perpetuating Knight's overall schema of "counterfeit neglect." *Veiling* is the process of disguising the specific mechanism of an emplaced environmental hazard—sustaining, in Cosgrove's words, "the appearance of non-intervention"; *swarding* is the process by which the element is naturalized and given the appearance of a long-abiding element in the larger landscape matrix; *hedging* is the surreptitious insertion of insurance structures alongside the hazard—a landscaped thumb-on-the-scale to safeguard the regularized dispersal of the intended effects and the overall benignancy of the structure—a persisting guaranty that the produced landscape "be ever policed, its edges and limits guarded, its morphology continually fortified against attack."[64]

In a discussion of rated mystery values in shopping malls, Kent draws upon the insights of the Kaplans and neatly sums up the task before us:

> If mystery contributes to preference in the built environment and if the elements contributing to mystery can be identified, landscape architects should be able to use this knowledge to design landscapes more appealing to users.[65]

Having administered a photo-based preference test, the author, predictably, discerns a positive relationship between preference and mystery. One mall of particular interest to the respondents was known as "Trappers Alley," a refurbished warehouse with "multiple levels, rich textures, and warm colors"

[64] Mitchell, 1994, 24.
[65] Kent, 28.

whose mean ratings "indicate it is a highly preferred environment."[66] Having established that the built environment is also subject to mystery-related rises in preference scores, Kent raises the question germane to the present study: What possibilities become available to us "when landscape elements are arranged to produce a view with considerable mystery"[67] as part of a coordinated effort?

It should be remembered that in the researches of Herzog and Miller, the simple effect of "setting category" was not significant in the final model of mystery.[68] The general class of a setting is less important than the specifics of the particular setting's layout, illumination, and surface qualities. To this end, we must experiment with the *practical generation of mystery effects* in simulation settings so that we might thereby locate the specific material practices best suited to consolidating or even augmenting the positive effects of mystery— while at the same time eliminating any actual spatial ambiguity *and* eradicating landscape elements that consistently result in a sense of danger/risk in respondents.

> Designers and planners can directly influence the physical makeup of a setting. For them, the message is that mystery can contribute to preference or fear, depending on the broader context in which it occurs.[69]

One lesson to be drawn from this insight is that one might conceivably fabricate a satisfyingly mysterious setting by—within a larger matrix of

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[66] Ib. at 31.
[67] Ib. at 34.
[68] Herzog and Miller, 1998, 443.
[69] Herzog and Miller, 1998, 446.

coherence and reliability—carefully crafting pockets of superficially risky visual cues.

> Planners should try to produce mystery in a way that also allows for legibility (to avoid the fear of getting lost), visual access (to avoid the fear of hidden danger), and locomotor access (to avoid the fear of entrapment). As a concrete example, gently curving paths with plenty of visibility in the bordering areas and a smooth ground texture throughout would satisfy most of these criteria.[70]

Ambiguity is tolerable to the extent that an eventual spatial pattern may be identified and a repent trajectory discerned; designers must "provide well-structured and imageable settings."[71] A winding path like the one described above, or a hedged labyrinth, can rate very high on a preference matrix because the viewer can sense the overall schema without much trouble. Landscapes that are truly unreadable or those that appear to be genuinely spatially irresoluble are to be avoided. Appleton is surely right to emphasize the role of phytogeography in making adjustments to nettlesome spatial configurations:

> In the contrivance of landscape for aesthetic ends it would be difficult to exaggerate the importance of arboreal vegetation. There are, however, other kinds of growth which may be highly effective in their own way. Reeds and rushes, for instance, can provide striking refuge elements, particularly since they tend to occur in or immediately adjacent to, water surfaces, which are strongly prospect-oriented. Just as there is an immense range of variation of types of vegetation, from grasses and bracken to forest trees, all potentially affording refuge, so there is an infinite possibility of combining their different shapes in a single composition. Vertical components can be provided, for instance, by the cypress; horizontal components by the cedar or the creeping shrubs. Vines and climbing plants can fill in gaps, cover surfaces and tie the composition together. The size and

[70] Herzog and Miller, 1998, 447.
[71] Herzog and Leverich, 2003, 460.

> texture of leaves and the degree of opaqueness they provide can all affect the general impression conveyed by a refuge as well as the aesthetic response of the observer, and all these variations stem from the nature of the substance or fabric of which the refuge is composed.[72]

There are many techniques for the installation of mild hazards that will serve to activate prospect-refuge gratification, while at the same time reassuring the subject with ultimately transparent horticultural intentions. To this end, the designer's purposes should be clear, veiled only to the extent that is pleasantly diverting to ask after—capable of being discerned with only a modicum of effort. One must offer periodic tags and markers 'hidden in plain sight' to indicate that, while a sense of mystery may pervade, all is, in truth, as safe as can be. Any introduced feature should serve as a corroborating affiant to the fundamental security of the scene and to its stable ideo-spatial parameters. The sensible planner will eschew all genuinely inconclusive arrangements of vegetation, and scenic assessment researchers would be wise to obey the same proscription that prudent landscape architects do: *avoid equivocal plantings*.

> No one can deny the perfection of the French chateau garden as its hedges twist and turn in an endless variation of classic patterns called *parterres*. Parterres are first an overall geometric design, resting calmly in a designated space. Closer observation reveals a rhythmic play of squares and circles, cubes, spheres and spirals combining into intricate patterns. Parterres are intriguing; they hold the viewer's interest as he mentally traces the curves, remembering perhaps his old geometry lessons. If one has developed an aesthetic awareness, he will be excited by the relationships of forms which the designer has established. If one is only beginning to

[72] Appleton, 1975, 104.

> realize these subtleties, he will find parterres fascinating, without realizing why.[73]

If we take as our goal the engineering of environments that might facilitate an ideal ratio of mystery to perceived danger, there is still important work to be done. Herzog and Kropscott offer support and a sense of direction, in light of the fact that mystery is often positively related to both preference and danger:

> Because this implies that mystery might contribute to either a positive outcome (preference) or to a negative outcome (danger, fear), *there has been lively speculation about how to use mystery in such a way as to achieve the former and avoid the latter*.[74]

For the purpose of optimizing this ratio to the extent possible, we propose the use of dynamic three-dimensional models in future preference-testing research. Improved test equipment of this sort would be suitable for future validity testing in which we might further narrow the correlative gap between our simulations and the environments they mimic. While "empirically, it has been found that responses to color photographs and slides are similar to responses obtained from perceivers located at the actual site from which the image was captured,"[75] there is increasing evidence that the introduction of dynamism and additional sensory enhancements might lead to test conditions wherein remaining deviations might be diminished or even eliminated.[76] The broader hope is that further preference studies with enhanced and more closely correlated simulation techniques will lead to (a) more precise

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[73] Church, 1969, 22.
[74] Herzog and Kropscott (2004), 663. Italics not in original.
[75] Heft and Nasar, 2000, 302. The primary study referenced here is Stamps, 1990.
[76] See Heft and Nasar, 2000, on the issue of dynamism.

identification of the characteristics pertinent to mystery; (b) an increasingly accurate calibration of simulated landscape features with corresponding reported-mystery values; and (c) enhanced ability to effect fine adjustments to the risk-mystery calculus. Moreover, a mechanism capable of reproducing the allied variables would be capable of generating the moderated sublime reliably and with increasing efficiency.

For Rapoport and Kantor, operating from the designers' perspective, the most vital task is to locate the "elements, the devices, the techniques, and the relationships which will provide optimum perceptual rates of input, the perceptual opulence which is needed."[77]

> We would propose constructing adequately scaled physical models which are changeable, so that psychophysical methods could be used, either with the observers being free to modify the environment until they were satisfied, or the experimenters changing it until the subjects stated they were satisfied.[78]

With such a physical model at hand, we might begin the process of working toward the optimal ratio, toward our goal of achieving "perceptual opulence" while at the same time indemnifying our peace of mind with reliable—though unobtrusive—undergirdings of ideo-spatial reassurance. It will be the task of a later section to demonstrate the great advances that such an invigoration of the preference-test apparatus might engender.

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[77] Rapoport and Kantor, 1967, 211
[78] Rapoport and Kantor, 1967, 220.

Firstly, however, it should be noted that historically there have been large-format simulations that have resulted in consonantly large distortions in the subject-perception. Some of these simulations have even featured sensory input beyond the visual field. The work of John Bankhead Magruder is exemplary in this regard. The following chapter will give a brief overview of this work.

field works

Stage magic is half rest, half astonishment—and there are military commanders who work like conjurers, drawing upon their facility for both.[1] Their achievements tend to center not so much on brute force as on a capacity to enact the unexpected and to mesmerize the enemy. There was Napoleon's *manoeuvre sur les derrières* that engaged the enemy with a frontal feint and then struck, with the benefit of surprise, at his rear. One thinks too of Stonewall Jackson—having marched his men distances no one imagined possible—suddenly appearing through the trees. "Always mystify, mislead, and surprise the enemy,"[2] he wrote.

General John Bankhead Magruder was a magician of this sort. A dandy and a showman, he combined a keen interest in the theater with the indirection of Napoleonic strategy. The illusions and misdirection he practiced on stage corresponded perfectly with Napoleon's sense of the battlefield as a site of demonstration and improvisation.

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[1] My understanding of Magruder's work was enriched, most personally, by J. Michael Moore of the Lee Hall Mansion in Newport News, Virginia, who gave generously of his time and wisdom during my visits to the Virginia Peninsula. His article "That Dam Failure" (from *North and South* 5: 64) was, additionally, of enormous help to me. Dr. Paul Casdorph, the author of Magruder's biography, took great care and thought in answering the questions I posed. Other sources of particular note for the outlines of Magruder's narrative include Settles (1972); McPherson (1988); Sears (2001); and Geer (1926).

[2] Bowdon and Ward, 184.

Magruder was born in Caroline County Virginia in 1807, and spent his youth in Villeboro, a settlement on the road between Richmond and Washington, known for its lively alehouse and inn. He attended the University of Virginia for about a year, where he read ancient languages alongside Edgar Allen Poe and dined at the table of Thomas Jefferson. He transferred to West Point in 1825 where he distinguished himself in mathematics, studied hydraulics, and amassed dozens of demerits for drinking and playing the flute after lights-out. He continued a study of French, begun in his youth, which allowed him to educate himself in the great works of military theory and tactic.

Friends from his Academy days describe a tall, handsome youth who— despite a penchant for finery —invigorated them with his recklessness and delight in the possibilities the school afforded for low mischief. He was known for leading night missions to Benny Haven's tavern a few miles down a densely wooded path, sometimes stealing a skiff and transporting the group to the alehouse by water. He was peripherally involved in the infamous 'Eggnog Riots' of 1826, wherein a group of cadets protected their stocks of grog by barricading themselves in their rooms and beating away investigators with makeshift clubs. In the light of the next morning, thirty-nine young men were expelled from West Point for their roles in the melee. Magruder remained, though his final standing among his classmates would have been substantially higher if not for his nearly 400 demerits.

He graduated to an army in hibernation. In the years before the war with Mexico many of the ablest soldiers in the States tramped about the country, piecing together what glory they could. Magruder was stationed variously, and never quite to his satisfaction. His mind hummed with plans to avoid the daily drudgeries of military life, and if stationed anywhere for long, he would devote most of his time to planning elaborate entertainments and drafting letters of request for leave or transfer.

He wooed a tobacco heiress from Baltimore named Henrietta, though after a whirlwind courtship and marriage they had little to do with each other. She was regularly called upon to settle the financial debts consequent to his appetite for entertainments. They did not live under the same roof for any extended period of time despite having three children and in 1850 she took them to live permanently in Italy. Many of Magruder's closest acquaintances had no idea he was married.

Even among a hard-drinking bunch, his thirst was legendary. He once passed out among some mailbags in the basement of a Baltimore hotel, and was delivered by stagecoach to Washington the next morning by a particularly conscientious postman. When he awoke at last, on the bench where he had been deposited, he walked straightaway to a bar and ordered another drink.

He tended to inspire loyalty in his fellow soldiers and suspicion in his commanders. He drew upon his future pay—sometimes a year hence—but was never known to hoard money for himself; his massive expenditures went toward banquets, or champagne and cigars to be shared around. While stationed in upstate New York, he convinced the moneyed citizens of Plattsburg to underwrite a winter festival the likes of which the town had never seen—a two-day affair with sleigh races and a splendid feast. On several occasions Magruder met pointed questions regarding his allocation of federal funds. In Plattsburg, he was indicted by a grand jury, though the case was later dropped. His entreaties for promotion were ignored, or shuffled to distant desks and forgotten.

Stationed in Corpus Christi in 1845, Magruder had his men build an 800-seat theater for the amusement of the local soldiery. As construction advanced, he set another group of volunteers to work painting scenery. He threw all his energies into the fledgling playhouse—rehearsing a troupe of actors, poring over scripts, and sending to New Orleans for costumes. In the days leading up to the war with Mexico, he was conjuring splendid theatrics in the salt wastes of Texas. Audiences poured in each night and the theater soon ran a modest profit. Enlisted men took great delight in their officers' attempts at song and dance. Female roles were played by the smaller men in the camp and the first drama to be staged was *Othello*, with a 23-year old Ulysses Grant initially cast in the part of Desdemona.

After Mexico—his military obligations having returned to their pre-war quiescence—he was once again free to focus upon rascality.

Magruder, fifty-four years old, arrived on the Virginia peninsula in late May of 1861. He now commanded a small force representing the only human barrier between the federal garrison at Fort Monroe on the peninsula's tip and the confederate capital of Richmond, seventy miles inland. Over the next year the federals' strength increased twenty-fold. Ships loaded with soldiers and supplies arrived weekly and the fort bristled with heavy guns.

Unable to convince his superiors of his precarious position, Magruder was forced to jury-rig a line of impediments out of what scraps he held. He assembled a personal staff of officers, aides and engineers—and set them to constructing two lines of defensive works. He authorized a series of excursions to test the enemy and keep them on edge. He had been there about two weeks when his men met up with a much larger force of federals near a church known as Big Bethel. The actions of the following hours brought him to the attention of everyone who was following the nascent War Between the States. He won a quick victory and suffered but one dead—a private who had offered to sneak forward and burn a house between the two massed armies. His exertions were abetted by opponents who spent the first minutes of the skirmish mistakenly firing upon each other.

In turning back the Federals, Magruder had bought himself some time and earned the rank of Brigadier General. Johnston, who had been sent to examine Magruder's line, went back to Richmond and pronounced it entirely unsustainable. He recommended an immediate retreat to the safety of the capital. From a stolid point of view, he was exactly right; the line was weak. But he underestimated Magruder's ability to bluff.

Virginia developed without a dominant capital and trade was dispersed across the territory rather than centralized round a primary point of commerce. The rivers on its coastal plain were generously dendritic; an abundance of creeks and channels meant even a humble farm might have outlet to open water. Exchange on the peninsula relayed through an informal network of shallow-draft boats, backyard jettys, and modest tide-mills. Describing Virginia in 1688 to the Royal Society, John Clayton marveled that "no country in the World can be more curiously watered."[3] It was this curiousness that Magruder spent the next months encouraging.

The battlefield is now incorporated into an 8,000-acre park lined with footpaths and dotted with canoe launches. On the property is a small museum called The Discovery Center the exhibits of which are divided between relics of the Civil War and zoological dioramas including one that illustrates the habitat of the local nocturnal animals. There is an exhibit

[3] Quoted in Boorstin, 106-7.

entitled “Sounds of the Night” with taxidermied animals situated in a dimly lit apse of painted cinder blocks and plastic foliage. Originally, there was to be a water feature running in front of it; a small pump gathers dust in a plastic gully, surrounded by a network of empty rubber tubes. A local outfit called *Beyond Exhibits* that designed the display went bankrupt toward the end of the construction process. A stuffed beaver leans on a half-eaten tree stalk. If a visitor pushes a button, a set of miniature lights will illuminate the animal and the sound of chewing wood will emanate from a ceiling speaker, giving an effective if rudimentary illusion of animation. At the entrance to the museum there is a working decorative fountain bubbling softly.

Figure 10. Habitat diorama, Newport News Park.
(Photograph by the author)

General George McClellan—known as ‘The Young Napoleon’ at just thirty-four—arrived at Fort Monroe on the easternmost tip of the peninsula in early April with orders to break the Confederate line and march upon Richmond, just seventy miles inland. He was ashore less than two days when he ordered his men up and on the march. They made sixteen miles by sundown of the first day. If they had continued at this pace with this kind of resolve the War Between the States would have likely ended in a matter of months.

It was not to be. Magruder had been working since the previous May, altering the landscape and stringing together a twelve-mile defensive line. On the second day out McClellan realized that he had been furnished with flawed maps indicating that the Warwick River harmlessly hugged the line of the James. The river he saw before him crawled north nearly across the narrow peninsula, spoiling hopes for a simple overland route. The waters were sluggish, fed by the tides, and bordered by low marshy ground—ending finally in an extended swamp.

Magruder had taken advantage of the land’s natural impediments and the rough joinery of its infrastructure. The Federals’ chief engineer observed, “Every kind of kind of obstruction which the country offered was skillfully

used."[4] The ground was already flat and prone to inundation so he set to work on three dams along a half-mile stretch of the Warwick. To this oft-flooded merse he would bring more water—obliterating the few crossings that did exist. In the woods his men set to work with saw and axe. The river's throat was clotted with lumber and peat. Felled trees were stacked into dams or piled high with their branches sharpened to face the enemy as an abbatis. Every natural obstacle was exaggerated. Every difficult passage was made thicker and more troublesome.

In constructing a fieldwork, engineers worked together with *artificers*—men who labored before the war as smiths, joiners, or carpenters. The head engineer walked the length of the proposed fortification, drawing an outline in the dirt with a stick to indicate the major features. He supervised the sinking of the first poles. The diggers then began the process of moving the earth, and the artificers set to work turning barrels and baskets into gabions to complete and buttress the structure.

Following construction, a fieldwork will soon acquire the demeanor of something alive, worn by use and in fact growing. "The face of the revetment may be sown with grass seeds or oats," counsels the textbook upon which Magruder relied. "When the stalk comes to maturity it should not be cut, but suffered to remain as a kind of thatch to protect the facing from the weather."[5]

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[4] Hess, 82.
[5] Mahan, 37.

If securing a house for use in combat, the author recommends tearing down the roof, lest it be set afire. The floor of the upper story should then be "covered with earth or dung, moist from the stable, to the depth of about two feet."[6]

Working all day, and by firelight after dusk, soldiers and plantation slaves had fortified the confederate position along the swollen river. It was twelve miles across the peninsula from the James to the York. They dug all day and slept in tents on the grass, illuminated by slush-lamps strung from twists of baling wire. An old grist mill was fortified as a redoubt to defend a slough tailing of the Warwick. The work absorbed Magruder; he rode back and forth between the sites, spending nights at one then another. Before this he had been known mostly as a dandy, the arbiter of things elegant; the glass of fashion, they said. He was muddying himself now.

Construction of a beaver dam begins with the sinking of chewed wooden poles into the stream bed. An animal will carry one of these in its mouth, dive underwater and plant it forcefully in the mud. After setting up a length of submerged uprights, the collective will begin placing the crosspieces, long branches and limbs at first, to support the smaller sticks and debris to follow. As the dam takes shape it will begin to emerge above the surface of the water. The stream will widen and slow and the beaver

[6] Ib. at 87.

group will bring timber from farther afield along channels dug especially for transport.

A lodge is built a few yards back in the slow depths created by the obstruction. It consists of several chambers below the surface of the water, each with its own musk and savor. The animals enter through an underwater passage that leads up and in to the dens. An entire family group will rest huddled together, a thermoregulatory strategy that allows them to become torpid without truly hibernating. The whole of the entrenched camp is topped with scavenged plant rubbish and then plastered with a thick layer of mud.

Radiating around the dam is an aquatic patch filiate to it—a persisting vacuole with its own temporal dynamics and its own cadence. The urgency of an erosive stream is supplanted by the lethargic pulse and swell of a deepening pond system, closer rhythmic kin to groundwater or seepage. The ground saturates and seethes with new vegetal process. Local creatures are drawn toward the snagged bower and it scaffolds new production, heretofore unrealizable.

A certain confusion lingers to this day about the burrowings and skirmishes of that month in 1862—two armies playing at each other across a swollen river. What is not in doubt is that Magruder's men were vastly

outnumbered, a tender, ragged line; “my feeble forces,”[7] he called them. They couldn’t possibly have withstood a sustained attack by McClellan and they never had to.

Whenever McClellan tested, Magruder’s soldiers were there in force enough to repel the skirmishers. Little Mac supposed that the old grist mill might be a weak spot but he suffered a repulse there that only strengthened his irresolution. The whole while Magruder was sending fake deserters across the line to tell tales of the massive force that lay between the Union men and Richmond. He marched his soldiers around in giant circles so that Union scouts peering through the trees would see an endless line of drilling cadets. His men lay additional campfires at night and dispersed them along less-populated stretches to give the illusion of an immense army at rest. Those nearby marveled at Magruder’s capacity for sustained bluff in the face of such close and imminent danger. A Richmond diarist remembered with a smile that Magruder “played his 10,000 before McClellan like fireflies and utterly deluded him.”[8]

The notion of misdirection—or in military terms, demonstration—is vital to any theater of battle. Feints are undertaken for the purpose of diversion or delay. One demonstrates in order to hold the enemy’s attention—to mesmerize for the purpose of prolongment. Magruder had been

[7] Quarstein, 35.
[8] Chesnut, 196.

demonstrating ever since West Point: eluding creditors, springing unexpected parties, and holding others in thrall until he could disappear.

With McClellan on the march at last and his strength in no doubt Magruder's superiors were finally sending help in his direction. Tens of thousands of men were making their way to the peninsula to reinforce him. All he had to do was hold McClellan a little while longer until the new soldiers arrived.

Looking back, all of Magruder's military actions are marked strange. Even later in the war when he was sent to Texas and delivered Galveston to the Confederacy it was with 'cotton-clad' boats—cruisers that were not armored but strapped with wooly bales. And there again he convinced the enemy that his force was much larger than it actually was; they declared a premature surrender. He will continually emerge from sleepy exile to deliver left-handed blows.

Back on the peninsula the Union troops stared across the river at dense forest. What lay beyond was unknown. The idle soldiers passed the time gossiping and chewing on their bullets to make them jagged. Every few hours one of their comrades would fall—the victim of a sniper's shot from the trees across the water

McClellan waited eleven days before he pressed again. His artillery batteries opened up shortly after sunrise, and all morning and into the afternoon they flayed the woods across the Warwick River. At three o' clock, Brigadier General William "Baldy" Smith sent 192 men of the Third Vermont Infantry across the river in a swift, deadly rush. The attackers sowed immediate confusion by killing a Confederate colonel just as he was rallying his men to the fight. They occupied the fled positions and dug in by the riverbank to await reinforcements from across the water. But the Confederates recovered quickly and soon pressed back hard; the Vermonters were jolted by the ferocity of the response and there was no sign of help from the opposite shore. What ammunition they had left was mostly damp. Backed up against the water and facing intensifying gunfire they were forced to re-cross the river. The regiment fell back waist-deep as fire was directed sharp, just under the dam, at the point of their fording. Twenty-three were killed before reaching the bank they had left just an hour before.

The frenzy of building—dams, fortifications, and bogs—had served its purpose. Doubts were planted and McClellan hesitated. He gave orders to prepare for a siege rather than any further assaults. Heavy equipment was ordered moved toward the front and his troops settled in. The spring rains had started and the roads had turned as soft as marrow. Magruder had played his part. His dams were working. The soil was inundated to overflowing. By all accounts he was soaked as well.

Visiting the area today one is struck by the closeness of the landscape. One walks a narrow footbridge and within a few moments has crossed the river that divided two armies. One barely has had to raise one's voice to be heard on the other side. The physical risk of Magruder's ruse becomes clear; the distance between the two camps isn't that much greater than the distance between stage and the back row of a theater. His scenic work was excellent—with a flimsy, tattered troupe he set the stage and mounted a production that captivated its intended audience. He improvised, went off-book at the most crucial moment, and succeeded. As was said of Napoleon, Magruder's genius was practical, not theoretical.

The reinforcements arrived in time and the Confederates were able to battle the Federal army away from their capital. The war lasted another four years. Magruder would repeat his performance thrice more before the Seven Days were over and his bluffs were crucial to the work of repelling the Union forces. When called directly to battle he tended to hesitate—there was the time that he marched his troops down the wrong road, away from the front. But at those moments when he was needed to absorb the attention of the enemy—to enthrall and delude—he was always magnificent.

As the battle for the peninsula wound down it was decided that Magruder should be separated from his soldiers. He had been given liquid

morphine to palliate a resolved withdrawal from alcohol but began to consume both substances in earnest. Sleepless and woozy, he rode the lines and shouted agitated orders. He started to lose the trust of his men. He had sown great bafflement among the enemy but now it was he who appeared confused. He was relieved of his command.

Robert E. Lee visited the camp and made his way to the farmhouse where Magruder lay in sickbed. Not so long before it had been Lee who was chided for his hesitations, his misplaced efforts. They called him Granny Lee; they called him the King of Spades. Because he moved slowly and deliberately. Because he set his men to digging. Now before him lay an exhausted Magruder and Lee offered his measured thanks. The lieutenant was seemingly on the mend with but a single request. He asked if Lee might please do something about the pack of monkeys carousing upstairs. Their merry racket was disturbing his sleep.

reconfiguration

In notes for a study of the Paris arcades, the German literary critic Walter Benjamin jotted to himself: “Why a fountain in a covered space is conducive to daydreaming has yet to be explained.”[1] As far back as ancient times, we find similar sentiment recorded in the popular literature; authors from Plautus to Pausanias give testimony to the enchantment offered by the sight of a controlled flow of water. There are, of course, untold variations on the simple water feature, from a small, dripping cistern to a lushly developed garden grotto—each with its own singular capacity to fascinate. In our beguilement, however, we may forget that these spurs to reverie are in fact the result of the efficacious interaction of a few elementary ingredients: good planning, correct choice of materials, a bit of ingenuity, and plenty of elbow grease.

In pursuance of the specific mechanisms to produce these states—which we oft consider to be outside the purview of intentional effort—the first step is to ask after the character of the setting you propose to reproduce, as Nash and Hughes elucidate:

> *What atmosphere do you want to create?* Whatever the landscape style of your private haven, water adds a psychological element that can ease the soul. Moving waters enhance a landscape visually and aurally.[2]

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[1] Benjamin, 405.
[2] Nash and Hughes, 1997, 13.

The patio literature is rich with descriptions of methods for prototyping any proposed full-scale environmental changes in miniature first[3] following techniques more elementary than, but not unrelated to, those deployed by Loutherbourg. When working with miniature prototype environments, one can create a semblance of any physical characteristic of a landscape—whether geologic, vegetative, or meteorological—and then set in motion a set of preference tests in order to determine the extent to which they correspond with the desired psychological outcomes. In modeling these features we will find that fine adjustments to their constituent elements can achieve precise, predictable results. It is vital, then, to quadrate our landscape practice to the psychological effects we hope to generate.

In an earlier chapter we observed the interrelationship between reported mystery and two variables in seeming opposition to each other: danger and preference. In order to fully capitalize on the potential to exploit this dynamic and create environments that feel safer and yet retain a charming mysteriousness, we must re-conceive and fine-tune our preference testing apparatus. Following the researches of Appleyard, Craik, and Loutherbourg, we propose new test equipment in order to exploit the potential of this dynamic more efficiently. In looking at the work of a painter like Turner—or later work by artists such as Rothko or Wilmarth—it would appear indisputable that various amorphous potentialities and effects can be enacted by specific, material means—for example a certain pigment, the right sort of

[3] See “Idea for the Owner of a Hillside Lot” In *Sunset*, 1955.

brush, or a particular glazing technique. Following the wide dispersion of computer simulation techniques, the work of researchers like Appleyard and Craik was neglected, as it was assumed that two-dimensional, screen-based stimuli could provide for every simulation need or eventuality. In neglecting the three-dimensional work, scientists cut themselves off from certain material effects, the enormous benefits of which are only now becoming apparent, as possibilities not subsumed under the computer paradigm are unearthed and deployed in the laboratory setting.

Herzog notes that "one need not sacrifice other desirable features such as mystery"[4] in the quest for a pleasant environment. Indeed, "judicious arrangement of setting elements can achieve both visual access and mystery."[5] Using test equipment based on Loutherbourgian principles, it is within our power to prototype all new arrangements of setting elements in an efficient, low-cost manner, and thereby locate the precise mystery-risk ratios we seek with greater ease and certainty. As environmental psychologists took ideological sustenance from the British landscape theorists of the 18th Century, it would seem appropriate to draw upon the era's facility for constructing accurate and evocative simulation media. Herzog notes "the key is to strike the right balance between visual access and partial concealment. Keeping both goals in mind can enable planners to achieve a design that is

[4] Herzog and Leverich, 2003, 475.
[5] Ibid.

both preferred and perceived as safe."[6] The key to striking such a balance is careful model prototyping, early in the design process, with preference testing performed at every juncture, to make sure that the designers have extracted all the "functionally essential features"[7] of an environment and put them to correct use.

The concept of an "artificial-natural" style—and its wide and quantifiable appeal—has been reinforced by the scenic assessment literature, particularly Zube (1974) and Daniel, et al. (1973). The public "frequently prefer intensely managed areas. Moreover, observers frequently justify their preference for a carefully designed park or intensively managed forest on the basis of greater "naturalness.'"[8] Whether aiming for *ferme ornee* or calculated agrestiality, it is at the crossroads of the managed and the natural that designers working to effect the moderated sublime will want to spend most of their time and effort.

Working not from an idealized sense of the untrammeled or upon rudimentary notions of preservation—which so often eliminate the human subject entirely from their considerations, the goal is rather to "reproduce, or at least mimic, natural systems"[9] while at the same time ensuring a legacy of pleasing interplay between humans and their environments. Manning writes

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[6] Herzog and Leverich, 2003, 475-6.
[7] McKechnie, 170.
[8] Daniel and Boster, 1976, 8.
[9] Ibid.

of a "self-grown landscape" that might be the result of spontaneous natural growth, or, importantly,

> can appear natural or wild while being achieved through careful management (as might have occurred in a 'picturesque' English landscape garden or perhaps the Thijsse Park where meticulous maintenance creates a natural ambiance). Man's influence in a self-grown landscape is either non-existent or artfully disguised.[10]

In choosing to artfully disguise the extent of the landscape's management intensity, a designer is able to achieve more control over the space, as well as eliminating, to the extent possible, any negative effects resulting from the vagaries of environmental chance. Rather than chancing upon sublime features in the natural landscape—and risking that, in their immoderate form, they might present real danger—we are now able to construct mock-up environments, test varying versions, and then construct them full-scale. For the prototype stage, we can extend the efforts of landscape theorist-practioners like Payne-Knight and experiment with specific techniques for the refinement and achievement of our accepted landscape categories such as the sublime and picturesque.

To demonstrate the enormous potential of such models, we might focus upon a landscape painting renowned in some circles for its "impenetrability," its amorphously melancholy character purportedly rendering it resistant to scientific analysis. In London's National Gallery hangs an oil painting by Jacob van Ruisdael purchased by the museum in 1871 but painted two hundred years earlier by the Dutch master. Entitled *Pool*

[10] Manning, 61.

Surrounded by Trees, the piece is commonly understood to represent the apex of Ruisdael's accomplishment—a poetically rendered landscape, of a singularly saturnine and dragged character, where two human figures are dwarfed by the gnarled forest around the swamp into which they follow a hare that they are tracking. In the foreground a dying aspen reaches toward the cloudy sky, while in front of it another has fallen into the quag where it lies rotting. The pool's water is dark and thick with patches of what appears to be a combination of lily growth and fanwort, and the pool itself would appear to have expanded at some point in the past, as many of the trees in the middle distance emerge from the water, their lower trunks submerged in the mire. From precisely where the hunters have emerged is unclear, as our prospect of their path is obscured by a horizontal flowering shrubbery toward the lower left of the canvas. Above the scene the abundant clouds are shadowy, streaked with dark grey and black. Taken as a whole, the painting feels downcast—the National Gallery notes that "the mood of gradual yet inescapable decay strikes a melancholy note."

Figure 11. *Ruisdael's "Pool Surrounded by Trees," dated mid-1660's.* (The National Gallery, London)

It has been said that Ruisdael's landscape resists all attempts to fathom it and that it is, finally, truly unknowable. Yet we might locate the specific, material processes involved in the production of the painting's melancholy air—and other less-than-ideal emotional states—and work first to moderate these effects, and then to cultivate more positive moods without wholly disrupting the general composition of the picture, or forfeiting those effects which draw productively on mystery or melancholy. In this way we might reliably generate the mostly-pleasant emotions associated with the moderated sublime. We can flag the loci of the painting's mystery a bit more

clearly as well as adding minor hazards to provide mental stimulation without evoking a sense of danger or dread. We will soon see that the painting isn't insoluable at all, but guided by the same textural and compositional principles that regulate works celebrated for their cheeriness. The key is to break the image down into its constituent elements and disaggregate each element according to its effect on the viewer.

The first step is to begin to classify the morphology of the landscape we hope to simulate. In terms of the Ruisdael painting, this involves asking after the specifics of the rocks, vegetation, and water features included in the landscape—and then working to reproduce them in a controlled setting. Williamson notes the importance of careful research during this stage:

> Creating realistic habitat exhibits is no accident. It requires careful study, planning, and a thorough knowledge of the artist's subject. One of the most helpful tools in a wildlife artist's studio will be a reference library. Any successful artist will have good reference materials within an arm's length while working and will refer to them often.[11]

Like Gilpin, however, the researcher must make a study not only of secondary materials, but of nature itself—and in the process compile a collection of reference material reflecting the landscapes viewed during the field research.

> Taking photographs of environment components requires very little effort and is time well spent. Take a systematic approach when building a reference library. One way to do this is first organize the reference library according to the classification, i.e. rocks, vegetation, water (liquid), water (frozen), and Groundwork. Then subdivide each classification to scenes that will likely be recreated in your studio.[12]

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[11] Williamson, 19.
[12] Ibid.

Especially in regard to preference testing for prospective landscapes, the wider the variety of reference materials the better.

> Your research into the nature of nature will help you duplicate the illusive shape of the hillsides and foliage in the real world…For example, are the hills steep like the peaks of the Rocky Mountains, or are they gentle like the hills of Kansas? (a 45 degree slope is steep in nature.) Are the surfaces of the slopes rough like the exposed rock faces of the Rocky Mountains, or are they smooth like the grass-covered hills of Kentucky's Blue Grass area? The plaster or foam-plastic scenery will have to be shaped to match[13]

In the Ruisdael painting, much of the viewer's sense of foreboding stems from the amount of the picture plane that is allowed to remain undefined and ambiguous—of unclear utility or intention. Kaplan, Newman, and Herzog all note that this is a particularly potent factor in the production of dread. Humans are "both curious and fearful at the same time,"[14] and pervasive environmental ambiguity "does not support effective human action, and thus could hardly be expected to enhance human satisfaction."[15] An environment of indeterminate meaning or purpose leads to a distinct feelings of uncertainty, or even peril. "Certain kinds of space and spatial layout favor the clandestine activities of criminals,"[16] and one of the key elements of such spaces is that they are symbolically ill-defined, without perceptible zones of behavioral definition.

> Because they force an outsider to the realization that he is intruding on semiprivate domain, symbolic barriers prove very effective in restricting behavior within the defined space to that

[13] Schleicher,14.
[14] Kaplan, 1973, 278.
[15] Ib. at 280.
[16] Newman, 13.

> which residents find acceptable…Within the confines of an area, defined if only by a change in surface texture or grade level, the range of possible behavior is greatly reduced. It is, in fact, limited to what residents have defined as the norm. All other behavior is incongruous and is so understood and dealt with. An intruder who does not know the rule system, or hesitates in making his intentions clear, is easily spotted as not belonging. He arouses suspicion which leads to the circumvention of his activities.[17]

We might regard our design efforts as part of the search for a stabilizing ontology governing the landscape—or perhaps more accurately, a coordinated introduction of an ontology based on explicit function as the basic, foundational value of a landscape—emphasized with an eye toward eliciting stable parameters and agreed-upon behavioral trajectories for the setting. In this way, our overall sense of the setting's purpose works as a stabilizing mechanism, ensuring a sort of ideo-spatial surveillance at all times. As designers in the prototype phase, we may engineer the terrain piecemeal so that we can receive regular appraisals of its ideo-spatial clarity and reliability from respondents. Portions of the landscape that are persistently ambiguous can be subdivided, re-fashioned, or corrected. Following Newman, we will eliminate spaces where a subject is wholly unsure of the landscape's purpose or of the sort of behavior expected. That said, a *winningly* tenebrous effect can be achieved by calculated placement of landscape markers ordinarily indicative of ambiguity, but situated within a larger matrix of agrestiality. In this way a designer can provide for the stable reproduction of controlled ambivalence. A good example of this technique

[17] Newman, 85

would be hiding the source of a garden waterfall with a vale of overhanging marginals such as *myriophyllum aquaticum*.

We can isolate the five primary physical features of the Ruisdael canvas that might serve as loci/repositories of mystery, to be discussed in turn: the body of water in the foreground; the dead stand of trees on the right hand side; the rather overwhelming thicket of foliage in the middle distance on the right and left; the rocky crest in the distance on the left; and the cloudy sky above the scene.

In the Ruisdael canvas, it makes little sense to remove the water feature altogether—despite its marshy, somewhat brackish character.

> Water, perhaps more than any other element of the landscape, has deep-rooted spiritual and symbolic meanings to which design must respond. As an element of great experiential power, water has historically been manipulated and shaped to create places of delight and beauty[18]

The pool in the landscape is precisely the sort of element whose positive psychological effects can be magnified, while its negative connotations subjected to diluent strategies. Often we will see the introduction of one environmental feature used to dilute the adverse effects of another. For settings in which it is not possible or desirable to remove the troublesome feature entirely, this is an excellent way to mitigate its effects. There are several mitigation methods that would be appropriate here, as well as several possible features to introduce. Firstly, the rushes and the cattails in the

[18] Hough, 81.

foreground of the painting might be reduced or eliminated. As Church notes, "one plant well chosen can improve a composition, where ten—fighting for light and air—more often result in utter confusion."[19] Why not replace the swamp flora with a few craggy boulders? A new feature such as this will offer picturesque raggedness with a hint of mountainous adventure, tempered nicely by the solid, predictable attributes of stone.

As for the dead and dying aspen trees in the foreground, in addition to having morbid connotations, their thick trunks could easily harbor a miscreant and might initiate an unpleasant fear response. Utilizing our miniature prototypes, we might experiment with any number of alternate features—retaining the charm of the overall composition while subtly marshalling "the softening effect of foliage"[20] or perhaps by the introduction of a hardy perennial—before pinpointing the environment most preferred by respondents.

The foliage of the painting, generally, should be thinned out, though the security literature suggests some subtlety in effects of varying arrangements of frondescence:

> Prospect and ease of escape may tend to covary because physical boundaries which limit prospect may also cut off possibilities for escape.[21]

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[19] Church, 30.
[20] Aul, 212.
[21] Fisher and Nasar, 1992, 40.

There are various vegetative configurations, all of which could be preference tested in miniature before incurring the expense of constructing it full-scale, that might be utilized here. In terms of staving off even more onerous expenses, Loutherbourg has demonstrated that meteorological and empyrean phenomena can be created in miniature, and at reduced cost—capabilities that are only enhanced today, given recent innovations in small-scale lighting technology. In the case of the Ruisdael painting, various cloud formations—fabricated from cotton bunting, illuminated from within—can suggest variations in color, texture and tone that will serve to soften the melancholy of the mood, while retaining the mystery. Lakeside Plastics have pioneered the use of revolving combinations of plastcine wound around two spools, backlit by fluorescent lamps, and operated by a small motor. Through a combination of dyeing patterns and alterations in motor speed, the designer can cause various colors to overlap and effect subtle changes, simulating all manner of meteorological and temporal effects (see Figure 12).

Once a novel feature has been introduced, it is vital to begin the process of visually naturalizing it—a technique referred to in the literature as *weathering*. The ideal is—in a system designed to afford the bare minimum in terms of ideo-spatial variation—to emplace mechanisms that offer the illusion of dynamism, so that the setting continues to beget a pleasurable prospect-refuge response. In an agrestial schema, features should be naturalized so as to not appear too novel or conspicuous, though they must

remain clear enough that their positive effects can register. While it is true that "the ultimate goal of a garden design is that it appear inevitable"[22] when planning "natural" environments, it is vital that the features within the environment do appear to be of natural origin. The techniques can be borrowed from the landscape architecture field, as in the following example

> One way to make a water garden seem like it's always been there is to study the contours of your land. Even seemingly flat sites have slight rises and slopes. Although you don't want to put your water garden in a very low spot, you might want it to hug a curve at the bottom of a slight slope for a natural look[23]

or, in the prototyping stage, from the field of miniature weathering, to ensure that newly added landscape features appear to be the same age as the rest of the setting. All of these efforts enable the appearance of "counterfeit neglect" Knight referred to.

The landscape thus undergoes the three-step process of veiling, swarding, and hedging. It is *veiled* in that introduced hazards such as the newly emplaced boulders suggest no obvious landscape management, nor do they call undue attention to themselves. It is *swarded* in that the boulders themselves are weathered and chosen specifically to remain within the bounds of the general character of the original scene. As Uvedale Price writes:

> There are various ways in which rudeness may be corrected and disguised, as well as blended with what is smooth and

[22] Church, 28.
[23] Rogers, 1999, 38.

> polished, without destroying the marked character of nature on the one hand, or a dressed appearance on the other"[24]

The landscape is *hedged* in that it is fitted with substratal structures of moderation to ensure stable scenic and behavioral parameters.

At every phase of the process—whether in the prototype stage where miniatures are constructed for the purpose of preference testing, or when the designs are constructed full-scale—let there be no real doubt as to the designer's ultimate trustworthiness and good intentions. As we have seen, the satisfaction associated with prospect-refuge response can be simulated without the viewer encountering situations involving real peril. It is hoped that with new test equipment created in congruence with the aforementioned principles we might learn to fabricate environments that more efficiently engender this pleasurable reflex.

[24] Price, 304.

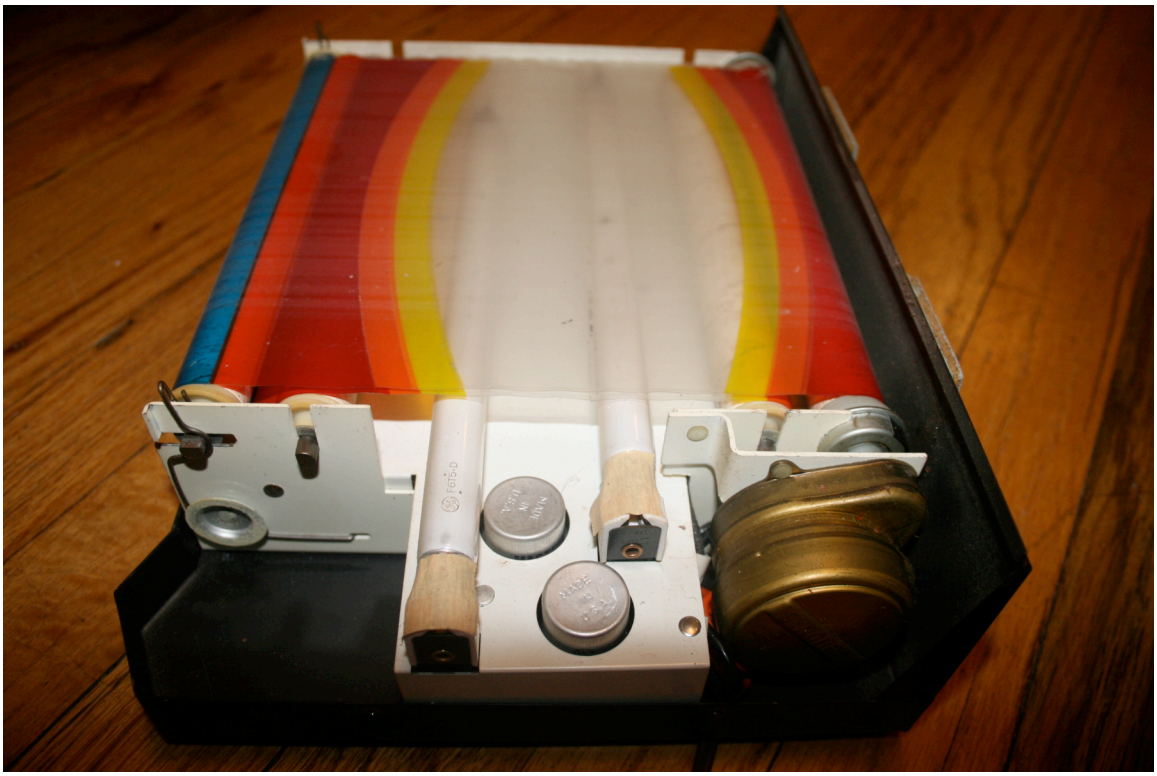

Figure 12. Simple mechanism for time distortion.
(Photograph by the author)

As regards the quote from Walter Benjamin with which we began this chapter, we have progressed now to the point where we are able to pose a series of questions with the goal of understanding the precise reasons a certain fountain in a particular covered space is conducive to daydreaming. We might ask, for instance: what sort of fountain exactly? How close are we to the fountain? Is our view occluded in any way? What is the combined lumen output of the sources lighting it? Is the sound of splashing water faint, or is it loud enough that it might render important sound cues inaudible?

scale

Several floors above the Austin campus of the University of Texas, there are dozens of rows of metal shelving that hold the models, papers and varied ephemera of Norman Geddes' life. A visitor is struck by the amount of *space* his fabrications take up—and by the mounds of attendant paperwork that document their creation. In the stacks of the archive, for example, is a dusty model for an NBC television studio, constructed entirely of brass. It is so heavy that it rests on two fortified file cabinets and the curators instruct employees and visitors to avoid any contact with it. Geddes consistently chose the most time-consuming methods imaginable, and tracked every moment of their conception and realization in painstaking detail. In photographs of his process, Geddes is always in the thick of things—hunched over near the floor, his face obscured, making small adjustments to the models. The battleships for his war models—just a few inches long—were constructed with jeweler's tools. A typical photographic set-up might demand hundreds of these and each vessel would take an entire day to finish.

After the 1940 World's Fair closed, Geddes had plans to transport the entire Futurama exhibit around the country by zeppelin, landing and exhibiting it on the outskirts of large cities and at rural fairs over the course of several years. The idea did not come to pass. Following the end of World War Two, he made the rounds of major U.S. corporations, bearing view-books filled with

his model photography in an attempt to convince heads of industry to use this illustrative method for their advertising and internal education campaigns. Most corporations he visited were committed to streamlining and saw no use for this process, so consuming and intensive in terms of both labor and time. He was able to garner a limited contract with Encyclopedia Britannica to illustrate the building of the Egyptian pyramids and the construction of the Panama Canal for the entries on these subjects. Geddes touted his method as the only way to achieve "impossible" photographic assignments. Any event could be photographed now—whether "in the black of night; five thousand years ago; or at the bottom of the ocean."[1]

Studies have demonstrated that "there is a consistent effect of spatial scale on the perception of duration,"[2] and models of variously scaled environments have produced markedly different effects in psychological studies. In one study (Mitchell, Davis 1986) two scale railroad station environments, of distinct, commercially available scales, were created and presented to research participants under controlled circumstances.

> Subjects were asked to remove watches and were instructed to look through a mask into the model. In the foreground there was a model station and platform with scale human figures on it, and in the background a stationary train. Model ground cover and a circuit of track were laid on the base and blue skypaper covered the inside walls of the enclosure. Subjects were told to imagine themselves as one of the figures on the platform and they were waiting for a train that was due to arrive in 15 minutes. They were asked to imagine themselves doing whatever they would do while waiting for a train and when they

[1] Bel Geddes (1952), 58.
[2] Mitchell and Davis, 15.

> felt that 15 minutes had elapsed and their train should be arriving to push a button beside them. After a subject had been instructed, he or she put on headphones through which white noise was played at a comfortable intensity to mask extraneous sounds.[3]

After conducting an analysis of variance, the researchers found a significant time compression effect—meaning that "the durations produced by subjects were shorter to a highly statistically significant extent when looking into the smaller railway model (1/160 scale) than when looking into the larger one (1/72 scale)."[4] These results reproduced the general trend, if not the magnitude, of DeLong's 1981 study of temporal perceptions of model sitting rooms constructed at 1/6, 1/12, and 1/24 scale. In his study, DeLong presented subjects with model rooms, constructed of cardboard, and instructed them to imagine that they were waiting for a friend there. He asked each subject to place a model human figure in a spot of his or her choosing where he or she could imagine waiting in such a scenario. Model couches and chairs were available. Having placed their figures, subjects were asked to focus on the miniature tableaux and report when they thought 30 minutes had elapsed. Subjects who had been 'waiting' in the 1/6 scale room reported that thirty minutes had passed in, on average, 5.43 minutes. In the 1/12 scale room thirty minutes seemed to pass in an average of 2.66 minutes. In the smallest room, 1/24 scale, subjects estimated that thirty minutes had passed after an average of 1.49 minutes.

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[3] Ib. at 6.
[4] Ib. at 6-7.

From these results, DeLong derived a "very specific linear relationship between the scale of the model and experienced time duration"[5]

$$E=x(T)$$

where *E* is the experienced time duration, *x* is the reciprocal of spatial scale, and *T* is the elapsed clock duration. The Mitchell and Davis results do not reflect nearly the magnitude nor the regularity of DeLong's equation—and in fact efforts by Mitchell and Davis to duplicate the scale and subject matter of the DeLong experiments led to the expected time compression in some cases, but there was also the suggestion that "with a further reduction of scale to 1/24 the effect disappears *or may well reverse*."[6]

As with the prospect-refuge mechanism, questions of optimal complexity and point-of-view are once again foregrounded. As to the question of complexity, Mitchell and Davis note that

> there may be a certain transition value for density of information beyond which it is not dealt with in the same sort of way. This effect is similar to that found by Hogan (1975; 1978), who describes his results in terms of stimulus complexity and whose views are summarized by Fraisse (1984), 'apparent duration diminishes from very simple to optimal complexity whereas apparent duration increases from optimal to excessive complexity since it is no longer possible to stock poorly perceived events.' On this account the point of optimal complexity in our experiments seems to have been reached or exceeded with 1/24 scale rooms. This does not seem to have been the case with the model railways, where the effect of time compression was still found when comparing 1/72 with 1/160 scale.[7]

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[5] Ib. at 5.
[6] Ib. at 10.
[7] Ib. at 14-15.

This raises the question of the relationship between the scale and vantage point provided by the model and the viewer's ordinary visual experience.

> We are accustomed to seeing the interior of rooms subtending a certain range of visual angles. When the range is greatly exceeded—as in a 1/24 scale model room whose interior subtends angles so small that we are never likely to have experienced them in viewing actual rooms—then the model is no longer accepted as something in which we could carry out various kinds of imaginary activity. With railways, however, we are quite accustomed to seeing trains and stations from distances such that the visual angles subtended are very much smaller. A 1/160 scale model still looks like a distant view of a railway, whereas a 1/24 scale model of the interior of a room no longer looks like a room. The time compression effect will depend on the relationship between the scale and the scene being modeled.[8]

The relationship between scale and time-perception is clearly of statistical significance though it appears evident that the interplay is more complicated than the elegance of DeLong's equation suggests. The relative ease with which researchers can make alterations to the scale, subject matter, and complexity of three-dimensional research models commend this an ideal format in which to test the theories of the current literature; make further progress toward a more precise definition of the relational calculus and the statistical significance of related variables; and further understand reported time compression and/or expansion. The dimensionality and suppleness of scale models are ideally suited to these tasks.

These experimental results reinforce the inextricability of invention and falsification from our day-to-day process of perception. Our efforts toward

[8] Ib. at 15.

more sophisticated preference testing are of a piece with Nietzsche's inquiry into a "law of the mechanism of delusions."[9] In fact, for Nietzsche, one sign of "the liberated intellect" is that it begins to construct a scantling of *conscious* illusion so as to aid in its further development. He saw the lineage that began with Aeschylus emerge from Greek ritual and from the chants and gestures of the countryside. The Dionysian impulse underlay folk rites and fed what was most intolerably radiant in early tragedy. It is speculated that early Greek harvest rites took place over the course of three days and nights with a procession circulating between the underground silos where grain was stored and the seashore, the celebrants "presented with sudden shifts from darkness to blazing light contrived by the use of massed huge torches."[10] The rites culminated by firelight in an underground bethel where a reaped ear of corn was displayed from the altar in silence.

> We have all the apparatus of the stage, the appearances and disappearances, the dancing and the singing, the lights, the voices and the darkness.[11]

In Mitchell and Davis, the objective is not to ask after *time* as something with eternal, immutable properties but rather to experiment with the scaffoldings that afford rhythmic innovation, the generative apparatuses that encourage the production of duration as we seek to create instruments and environmental arrays that artificially induce prospect-refuge response.

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[9] See Vaihinger, 343.
[10] Pedley, 95.
[11] Harrison, 1903, 570.

Nietzsche's own investigations had their source in periods of personal turmoil and philosophical solitude when he found it necessary to rely on simulations for sustenance.

> Where I could not find what I needed, I had artificially enforce, falsify and invent a suitable fiction for myself (-and what else have poets ever done? And to what end does art exist in the world at all?). What I again and again needed most for my cure and self-restoration, however was the belief that I was not thus isolated, not alone in seeing as I did—an enchanted surmising of relatedness and identity in eye and desires[12]

The notion of retreat for the purpose of convalescence recurs frequently in Nietzsche's published work as well as in journals and letters. His philosophical quest was intimately tied to his own journey toward an individualized regimen of self-administered curatives. Periods of sickness and desolation were constituent elements in a larger unity with his most lucid, productive moments.

The important thing was to observe oneself and devise the correct methods of recovery. At points *Ecce Homo* reads like a collection of home remedies, counseling cocoa over coffee and spring water over spirits. The chapter entitled "Why I Am So Clever" assigns credit mostly to the climates he chooses to live in, and to the close attention he has paid to his own digestive process. "One has to *know* the size of one's stomach,"[13] he insists.

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[12] Nietzsche, 1996, 5.
[13] Nietzsche, 1988, 53.

A hibernating animal undergoes significant changes in its sense of time. A twitchy metabolism becomes torpid. To take advantage of the thermal savings of sluggishness, heart and respiratory rates will slow to near imperceptibility. Before going to ground for the season, the animal will likely set up a store of food in its den—or gorge itself to prepare for the fallow period. The word burrow comes from the Old English, burh—a fortress. One can begin a burrow anew, or make use of a passage-system already excavated. It is not unusual for foxes to use tunnels and chambers dug by badgers, just as wanderers of old would take refuge in the ruins of a defeated castle. Lange echoes this notion when he writes that, in his later years, Goethe took refuge in the *Ethics* of Spinoza.

Nietzsche makes explicit his empathy with the process of animal torpor: "I have lived in solitude too long, living off my own fat,"[14] he wrote to a friend in a sentence that could have just as easily appeared in Kafka. He will continually track his stocks of provisions, the state of his larder. If he has amassed enough to nourish himself during a fallow period, he will take great satisfaction in numerating what has been laid up—a reassurance akin to the feeling of watching vigilantly over one's own sleeping body.

Nietzsche used dens and holes to retreat and reassemble his forces. He took pride in his sense of timing and feel for the resting measure—gifts that would have well suited an actor or a general. He understood the

[14] Nietzsche (1996, 2) 199.

strategic value of dormancy and his arsenal was stocked with fallowing techniques—"old artillerist that I am."[15] His procedures called for great patience, a willingness to endure, abide, and wait for precisely the right moment.

> We must not will a state; rather, we must will to become periodic beings—like existence.[16]

The day would come when the weather shifted, and he would be able to climb into the mountains and watch over his ideas as they developed and grew.

After *The Birth of Tragedy*—a first book, written in a blaze of confidence—Nietzsche found himself censured by his peers and laid low by staggering headaches. In the preface to his next book *Human, All Too Human*—which he later described as a monument of a crisis—he wrote that in the most difficult moments of its creation, "I sought shelter in this or that…and where I could not find what I needed, I had artificially to enforce, falsify and invent a suitable fiction for myself."[17] He was on the run—betrayed by his closest creative companion; a marriage proposal refused; his academic prospects dimmed. Meeting two friends at a country home in Italy, he would lay low, convalesce, and write.

Lou Andreas Salome —who had turned down his offer of marriage—explained later that

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[15] Krell and Bates, 209.
[16] Quoted in Porter, 267.
[17] Nietzsche (1996) 5.

> It was when he felt most healthy and most robust, in complete control of his creative powers, that he came closest to his illness: and it was the forced rest and idleness that would again allow him to recover and to keep the catastrophe in suspense.

The book he started in Italy was nothing like the first. This one was splayed, fragmentary—scavenged from the respites between spells of incapacitating illness. His new style was partly an emulation of the aphorists he admired, though these short paragraphs might have been all he could muster in his state—sharp clusters of sentences hammered out between migraines.

To do justice to the cycle of illness and self-restoration so vital to his method—to suggest it as palpably as he could—he drew upon his roots in philology. In a section titled *Man Alone With Himself*, Nietzsche will offer an intimation of a tone that will reverberate through the rest of his work whenever he means to convey the great rewards of periodic sickness and recovery—the unparalleled joy of cultivating one's own health.

> To elude boredom man either works harder than is required to satisfy his other needs or he invents play, that is to say work designed to assuage no other need than the need for work as such. He who has become tired of play, and who has no fresh needs that require him to work, is sometimes overtaken by a longing for a third condition which stands in the same relation to play as floating does to dancing and dancing to walking—for a state of serene agitation: it is the artist's and philosopher's vision of happiness.[18]

What to call this feeling of lightness, this serene agitation? At the end of his creative life, shortly before the final self-examination of *Ecce Homo*, he offers

[18] Ib. at 121.

his most succinct formulation of the happy state he proposes, in contradistinction to the heaviness of a then-omnipresent Wagnerism:

> They are quite right, these German youths, considering what they are like: how *could* they miss what we others, we *halcyons*, miss in Wagner—*la gaya scienza*; light feet, wit, fire, grace, the great logic; the dance of the stars; the exuberant spirituality; the southern shivers of light; the *smooth* sea—perfection.—[19]

Halcyons. Nietzsche will use the word again and again when he describes the clarity of a restorative period following a sickness. He will write of halcyon smiles, halcyon spirits, a halcyon *tone*. The word likely first caught his attention in Ovid's *Metamorphoses*, where Alcyone, the wife of Keyx, beseeches her husband not to embark on a dangerous sea journey to consult an oracle. He embarks, nonetheless, and Alcyone is soon visited by a vision of him, naked and shipwrecked, before her bedside. Still dripping from the sea, Keyx's ghost tells her he has died "and floods have filled my mouth which called in vain upon thy name." The next morning the grieving Alcyone wanders the shore and the tides bring her husband's corpse to her. She leaps toward him, but suddenly begins to fly—she has grown feathers. The gods have been moved by her great sadness and when she kisses her husband he too becomes a bird—a halcyon, a kingfisher. And now, says Ovid, every year in the winter season, the waters are calmed for seven days so that Alcyone can build a floating nest of the smooth surface and watch over her eggs.

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[19] Nietzsche, 1988, 74.

Plutarch—another of Nietzsche's guiding lights—upbraids himself for nearly forgetting the halcyon toward the end of his treatise on the cleverness of animals. "I have neglected and omitted the wisest of sea creatures, the most beloved of the gods!" he writes. "What creature's procreation and birth pangs have the gods so honored?" Plutarch is moved by her loyalty and dutiful preservation of her offspring, exemplified by the building of the nest.

> The halcyon, having but one simple instrument, one piece of equipment, one tool—her bill and nothing else, cooperating with her industry and ingenuity—what she contrives and constructs would be hard to believe without oracular evidence, seeing the object that she moulds—or rather the ship that she builds. Of many possible forms, this alone cannot be capsized or even wet its cargo. She collects the spines of garfish and binds and weaves them together, some straight, others transverse, as if she were thrusting woven threads through the warp, adding such bends and knots of one with another that a compact, rounded unit is formed, slightly prolate in shape, like a fisherman's weel.[20]

The creation, then, of an enclosed work, whether nest or fortress, foxhole or lodge—*this* is the thing: a heartfelt cachement where our enchantment might gather.

> When it is finished, she brings and deposits it beside the surging waves, where the sea beats gently upon it and instructs her how to mend and strengthen whatever is not yet good and tight, as she observes it loosened by the blows. She so tautens and secures the joints that it is difficult even for stones or iron to break or pierce it. The proportions and shape of the hollow interior are as admirable as anything about it; for it is so constructed as to admit herself only, while the entrance remains wholly hidden and invisible to others…[21]

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[20] Plutarch, 45.
[21] Ib. at 51.

To name his ideal tone, then, Nietzsche hearkens back to the halcyon, a bird known primarily for its *nesting* habits—for constructing a snug, carefully wrought chamber in a time of difficult weather. Rather than imitating the call of this bird, Nietzsche suggests we take inspiration from her bearing, her composure as she constructs on waters that have been momentarily stilled. She has built a structure to perpetuate a rhythmic personage. At the time of the winter solstice there will come a period of unexpected calm and she will weave her nest in a state to which one should aspire in the face of impending heavy weather—a kind of productive serenity. Nietzsche sets a twofold task for himself: he must not only produce his books, but also devise nest-structures to protect them as they gestate. "Thought is circuitous" writes Vaihinger,

> herein lies the real secret of all fictions. The primary object of a logical theory is to separate these devious from the essential starting points and goals of thought. Fictions are mere temporary halting places for thought[22]

There is, of course, no reason to call upon illusion to continually justify its utility by transforming into middling truth. The falsificative apparatus is loosed from these chores and has nothing to prove nor signify; it simply demonstrates. In the construction of these dens and lodges we see a kind of excogitation signaled by endless knitting and a taste for sluggishness—whether a bejeweled aircraft carrier or a gunboat strapped with woolen bales; a sapling chewed down or a muddy slit trench. One needn't embrace

[22] Vaihinger, 100.

Vaihinger's efficiency to understand the force of the underlying structure of his argument: the kinship between repose and simulation, the slow and the false.

Human, All Too Human begins to suggest Nietzsche's distant hope for a sort of becoming that will take us beyond the fetters of our current habits and bodies. In the preface he writes

> It is still a long road to that tremendous overflowing certainty and health…to that *mature* freedom of spirit which is equally self-mastery and discipline of the heart and permits access to many and contradictory modes of thought…to that superfluity of formative, curative, moulding and restorative forces which is precisely the sign of *great* health, that superfluity that grants to the free spirit the dangerous privilege of living *experimentally*…[23]

Along the way to health a different sort of day will dawn.

> There is a midway condition which a man of such a destiny will not be able to recall without emotion: it is characterized by a pale, subtle happiness of light and sunshine, a feeling of bird-like freedom, bird-like altitude, bird-like exuberance…"[24]

"It was only *sickness* that brought me to reason."[25] The difficulties are accepted provided one can recollect and transfigure these events—bind and weave a shelter from them where one can lay up stores, gather strength, protect the clutch of one's becoming. "I fully intend to continue henceforth as my own physician,"[26] he writes to his mother in 1881. No more time would he spend in Basel or Naumberg, under gray and birdless skies. Winters were to be spent in Nice, summers in Sils-Maria. He was constructing a system of

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[23] Nietzsche (1996), 72.
[24] Ibid.
[25] Ibid.
[26] Nietzsche (1996,2), 81.

nests across Europe to which he could migrate and roost, following the climate.

In 1870, when he was twenty-five, Nietzsche delivered his first lecture on Heraclitus as part of a seminar on the pre-Platonics at the University of Basel. It has been widely noted that the young professor felt a strong kinship with the solitary, riddling Ephesian. "My intention," Nietzsche wrote in his notebook, "is to entertain young men who know Latin and Greek by telling them a simple story about the great Greek philosophical masters."[27] Ludwig von Scheffler was fortunate enough to attend one of Nietzsche's classes on a day when no other student bothered to show up. He was treated to a private lecture:

> (Nietzsche) let the so-called pre-Platonic philosophers pass before my inner eye in a series of fascinating personalities. Since he also quoted them directly, he read slowly and let the deep thoughts in their statements penetrate all the more into my spirit…But one of those lofty forms detached itself with clearer profile from that dissolving flow. Here the lecturer's voice was overcome by a gentle trembling, expressing a most intimate interest in his subject: Heraclitus!! I shall never forget how Nietzsche characterized him.[28]

Though Heraclitus wrote, "War is the father of all things," Nietzsche cautioned his student not to mistake this affirmation of endless strife as despondency: "At his core he is the opposite of a pessimist because he does not deny away sorrows and irrationality."[29]

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[27] Nietzsche (1995), 53.
[28] Nietzsche (2001), 256.
[29] Ib. at 258.

Offended by the forced exile of a friend, Heraclitus had retreated from society and lived in a small temple beyond the city, passing his days tossing knucklebones with children. His writings were gnomic evocations of a ceaselessly changing universe, guided by a force akin to a child at play. Of the one book he produced, Socrates is said to have remarked, *What I understand of it is noble, and I also believe the parts I don't understand*. One imagines Nietzsche only felt closer to Heraclitus as his life went on and he too went into exile and began writing aphoristically. "He speaks in entrancement," he told his students, "Like the Pythia and the Sibyls, but truthfully."[30]

Nietzsche elaborated upon the sense of duration in Heraclitus, fleshing out his conception with examples from the natural sciences—specifically the work of embryology pioneer Karl Ernest von Baer—and offering an idiosyncratic sense of natural history and its relationship to rhythm and rest. "The rates of sensation and of voluntary movements, thus of conscious life," Nietzsche told his small seminar of Classics students, "Appear among various animals to be approximately proportional to their pulse rates.

> Well then! Since, for example, the pulse rate among rabbits is four times faster than that among cattle, these will also experience four times as much in the same time period and will be able to carry out four times as many acts of the will as cattle—thus in general experiencing four times as much.[31]

[30] Ib. at 256.
[31] Ib. at 260.

He goes on to narrate a thought experiment wherein the human pulse rate is accelerated or decelerated, and describe the effects it might have on our consciousness. "We think it very important," he told his students

> whether pulse rate, rate of sensation, and the human intellectual process either decelerate or accelerate, since in this way they are fundamentally altered.[32]

Even before *The Birth of Tragedy From the Spirit of Music*, Nietzsche had looked to the ancient Greeks as the apex of creative achievement, not least in regard to tone, pace, and dynamics. By marshalling contemporary scientific work on the physiological rhythms of animals, he sought to demonstrate the prescience of Heraclitus' intuitive perceptions. The new sciences of his day suggested that, at the cellular level, all things did indeed flow—nothing persisted in nature but eternal flux and becoming. While encouraging his students to imagine a human lifespan of eighty thousand years—or of forty minutes—he called attention to the relativity of our sense of time: "Whenever a human being believes he recognizes any sort of persistence in living nature, it is due to our small standards."[33]

Continuing on, like a conductor before an orchestra, Nietzsche suggested a series of alternate natural rhythms—leading the class deftly through an unfamiliar ebb and flow, the variously measured recurrences. He conjured new senses of time before their eyes. Perceived under diverse

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[32] Ib. at 263.
[33] Ib. at 280.

conditions, a winter solstice might flash past imperceptibly while we blink—or it could be slowed to a crawl and prolonged for years. In such a mode, "we would be able to follow a flying bullet very easily with our vision…we would consider the grass and flowers to be something just as absolute and persistent as we now consider the mountains."[34] In narrating this experiment to his students, the young Classics professor became exultant. He oscillated between scientific analysis and cryptic utterances not unlike those of Heraclitus:

> We would be totally unable to observe the voluntary movements of animals, for they would be far too slow; at best we could conceive of them as we think of the heavenly bodies. And with a still further reduction of a lifetime, the light that we now see would perhaps become audible. Our sounds would become inaudible.[35]

The faintest sound of running water will compel a beaver to walk its entire dam searching for the breach and begin the process of repair. The animal has keen hearing, and—doing most of its construction at night—depends greatly upon its ears. A dam diverts the flow of a stream and creates a still pond, or several, in the place of the watercourse. When faced with a rushing river, the beaver's reply is impoundment, dilution through inundation. The overarching purpose of the dam is to create a stable aquatic environment in which to *frolic*. "His life is full of industry and is rich in repose," wrote Enos Mills of the beaver in 1890, "He is home-loving and avoids

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[34] Ibid.
[35] Ib. at 279.

fighting. His lot is cast in poetic places."[36] The animal blunts forward momentum and fosters a distinct sense of duration—staggered, eternally circulating. Imperiousness is converted into errantry; a river, having been thwarted, becomes inexhaustible.

Of all of Geddes' unrealized plans, perhaps none is as evocative as the semi-submerged restaurant he planned in Chicago called The Aquarium. The structure was to be built upon a lagoon, with water dammed to fall in a curtain over it, "making it a veritable underwater palace, its exterior walls illuminated at night by invisible lights beneath the water."[37] To enter the building would satisfy a remote longing—to inhabit a dam. A visitor would have the sensation of walking into the rushing water while remaining swaddled safely in an investing membrane of glass.

The locus of the restaurant was 'the aquarium' where patrons could safely observe marine life from a dim, insulated coign of vantage. "The interior walls, ceiling and floor are made wholly of glass so that the visitor, with the tanks above, below and on all sides of him, has the illusion of actually being with the fish in the tanks themselves.

> The illumination comes solely through the water and changes from warm amber at the top to a much darker color at the bottom. In this way the small, brilliant-hued surface fish are seen swimming in a bright, becoming light, while the larger, deep sea fish lurk in the weird, mysterious waters below.[38]

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[36] Mills, 64.
[37] Bel Geddes file No. 142, Harry Ransom Center, "The Aquarium Restaurant."
[38] Ibid.

The restaurant experience was carefully managed for progressive enchantment, introducing audio and visual cues in seriatim for "pleasant eerie effect."[39] The entire structure was veiled in a "transparent liquid curtain"[40] of falling water, endlessly pumped and returned to the spillways. One was to enter the restaurant from shore through a long tunnel, and then move through a maze of transparent passageways, sloping gradually downward, descending finally to sixteen feet below the water level, the sublime culmination of the circuit.

> The whole atmosphere of the interior suggests to the observer a visit to the bottom of the sea as he walks intimately through the strange, unearthly marine life entirely surrounding him, the gurgle of water forever in his ears.[41]

"To get past Hellenism by means of deeds," Nietzsche writes, "That would be our task. But to do that we have to first know what it was!"[42] His lectures in philology, staged under the light of Laertius, were weekly evocations of the great Hellenes, fervid conjures forged as from animal fat and classroom dust. He would begin with what was known of the figure's lineage and time of birth. He sifted through the various sources and testimonies—in the case of Thales he figured his age using concurrent testimony about a solar eclipse. He offered an assessment of Thales'

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[39] Ibid.
[40] Ibid.
[41] Ibid.
[42] Nietzsche (1969), 28.

character, specifically the relationship between his person and his work: "He lived as he wrote; he spoke as solemnly as he dressed."[43]

Thales lived in Miletus, a thriving port on the Aegean Sea. Some say that he left no writings, others that he wrote several manuals of a practical character. Records suggest he may have authored a Pilot's Book of the Stars; certainly he made contributions to the fields of engineering and nautical astronomy. It was he who gave the Greeks the practice of steering a boat's course by Ursae Minoris—using that star to locate north. As a young man he visited Naukratis, a trading center near the mouth of the River Nile. During his sojourn in Egypt he devised a method of reckoning the height of pyramids by measuring their shadows. He counseled an education in geometry because it bore practical effects; he inspired his pupil Anaximander to construct a model sphere illustrating the mechanics of heavenly bodies.

While serving in the army, his regiment reached the Halys River and his commander could find no way to cross. Thales instructed his fellow soldiers to dig a crescent-shaped trench and divert some of the rushing water. The men set to digging in the loose soil, a sunken arc several feet deep and across. This fresh canal drew a second flow behind the encamped army, rejoining the river downstream. In this way, two smaller rivers were created, both of them fordable.

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[43] Ib. at 29.

It was Thales' contention that even inanimate things can be alive. "The world is full of Gods," he said.

The lecturer, who combined the gifts of actor and artillerist, recounted how the insights of Thales had given rise to philosophy in Greece. He prodded his students toward a reckoning with Thales' dictum: *Not man, but water is the reality of all things.*[44] It would seem a strange insight from an early figure of science, and Nietzsche suggests Thales exemplifies a new method of thought—loosed from mythology and allegory and able to convert scientific intuition into art. He would remind his audience that the word for sage comes from *sapiens*, he who tastes. "Thales is long gone," he told his students, "But a painter standing before a waterfall will agree with him."[45]

In the course of his lengthy studies, Thales had grasped a truth only sporadically cognizable—capable of articulation, perhaps, through the most indirect of means, the most counterintuitive of fabrications. And yet he will shepherd it into being, no matter how few may recognize what is at stake in the process. "He grasps for it in order to get hold of his own enchantment, in order to perpetuate it."[46]

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[44] In her introduction to the Gateway edition of *Philosophy in the Tragic Age of the Greeks* (1962) Marriane Cowan notes that Nietzsche's quotations of classical sources "are not necessary correct citations from the ancient texts; in fact they almost never are." *Not man but water is the reality of all things* "is not a citation from any extent source of Thales." (Cowan, 21).
[45] Nietzsche (1969), 51.
[46] Nietzsche (2001), 142.

> Just as for the dramatist words and verse are but the stammering of an alien tongue, needed to tell what he has seen and lived, what he could utter directly only through music or gesture, just so every profound philosophic intuition expressed through dialectic and through scientific reflection is the only means for the philosopher to communicate what he has seen. But it is a sad means; basically a metaphoric and entirely unfaithful translation into a totally different sphere and speech. Thus Thales had seen the unity of all that is, but when he went to communicate it, he found himself talking about water![47]

A classicist who each day cared less and less for academic decorum, Nietzsche appeared to a student as seeming "to know of absolutely no relation to another being."[48] He struck deeply into the writings—articulating what was strange, inconsistent—with a kind of flamboyant languor. Thales was drawn toward hydraulics and liquefaction because he was fascinated by the fact that a solid human emerged from coagula—semen and egg. Magnets must have souls because they attract iron filings. In front of a class, Nietzsche spoke quietly, moving between Greek and German, pronouncing the same word several times if it were sufficiently lovely or vexing. A former student recalled his efforts to build

> …upon a philosophy that was still not his own, but was adjusted to his feeling. The warmth of his presentation, the manner in which this worldview took shape before us in his words, nonetheless gave me the impression of something new and completely individual. It lay like a cloud on this man's entire being. And over and over the question came to me as I listened:
> *Who is he? Where is he heading for, this thinker?*[49]

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[47] Nietzsche (1969), 31.
[48] Nietzsche (2001), 140.
[49] Ibid.

There was no clear end to the lecture. Nietzsche offered a curt utterance and allowed it hang in the air—an aphorism of his own? He was silent for a time afterward, standing very still. The room tone reasserted itself and once again the students' ears were filled with the sound of the Rhine outside the classroom windows. The professor sank back into his chair and seemed to be listening to the rushing water himself. A minute or so passed. "Then he got up slowly. And gently and silently as he had come, he walked back out the door."[50]

In northern Italy, at what would be the last of his solitary lodgings, he sent a letter to George Brandes, the Copenhagen professor who had the month before delivered the first public lectures devoted to Nietzsche's work. In early May of 1888 he wrote: "These last weeks at Turin, where I shall stay until June 5, have turned out better than any I have known for years, above all more philosophic."[51] Thoughts from his past were resurfacing to make complete his latest writings. He now had the strength and concentration to work his obsessions—old and new—together into a whole. "Almost every day for one or two hours, I have packed such a pitch of energy as to be able to view my entire conception from top to bottom; so that the immensity of problems lies spread out beneath me as a relief."[52] Scavenged bits from years before were suddenly emerging as indispensable: "One builds one's

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[50] Ib.at 139.
[51] Letter to Reynhart Von Seydlitz, May 13, 1888. Quoted in Krell&Bates (1987), 206.
[52] Ibid.

philosophy as a beaver does his dam," he told Brandes, "One is forced to and does not know it."[53]

Days in Turin were divided between brisk walks in the Alpine foothills, notebook in hand, and the desk of his rented room. "One has to *see* it all in order to believe it, as I have seen it now."[54] He had great affection for the city because it was off the beaten path and scarcely known to foreigners. "The educated German travels right on by it,"[55] he wrote to a friend. Something about Turin had sent his sickness into abeyance as well—his strength returned, his headaches disappeared, and he ate heartily. "The nights are cool," he enthused, "From the middle of the city you can see the snow."[56]

[53] Ibid
[54] Ibid.
[55] Ib. at 225
[56] Ibid.

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