



Peripatetic Measure: A methodology for founding temporal sites.

Ian Weir

University of Western Australia

Site measurement is commonly conceived as being completed prior to design and dwelling. But we need not assume such a linear and *exclusive* process where future unforeseeable conditions such as error and epiphany are prevented from their articulation within built form. I argue that a more open, *inclusive* process is enabled when measurement is applied peripatetically to the unfolding process that characterises site, design, and habitation.

Conducted during the course of my PhD research (by design), Peripatetic Measure was tested over a four-year period through the detailed mapping of change in an extremely biodiverse site on the south-coast of Western Australia. These mappings have registered such dynamic events as incineration by bushfire and the subsequent regeneration and spread of colonising species; diurnal and seasonal climatic conditions (particularly wind patterns); and the evolving habitation design which continued to be tested on-site with full scale scaffolds and frameworks. In addition to presenting these mappings, this paper reports on the technology employed including animated aerial photographs, repetitive botanical maps, and sequential, high resolution Terrestrial Laser Scanning, Global Positioning and Total Station surveys.

This research is contextualised by discussing writings on “mapping” by James Corner and the “perpetually redefined site” by David Leatherbarrow. The paper concludes that with Peripatetic Measure the durational experience of mapping is emphasised over the idea of the map as a static artefact. “Mapping” the verb subjugates “map” the noun and so *temporality* begins to subjugate *spatiality* as the primary subject of both measurement and design. As measure becomes elevated beyond that of being a priori to design and dwelling—analogueous to outmoded conceptions of “site” as a priori to experience and intervention—the normally detached activities of mapping and habitation become fused as one.

“Not all things architectural can be arrived at through drawing.”
Robin Evans.

The word *peripatetic* is commonly used in its literal form: *working or based in a succession of places (or times) for a short period*. This meaning is derived from the manner in which Aristotle is said to have conducted his teachings throughout the Lyceum: by walking to and fro. The source word *peripeteia* adds an important dimension to this literal meaning: it signifies—and here I borrow from David Leatherbarrow—“the ensemble of reversals that animate narrative unfolding ... a reciprocating sort of continuity.”¹ My Oxford English Dictionary meanwhile, defines *peripeteia* more dryly as “a sudden reversal of fortunes.” When consolidated, a singular concept arises from these definitions: an unfolding process which proceeds through the development of new knowledge made necessary by chance occurrence and reflection.

Peripatetic Measure is a hypothesis specifically concerned with the production of site-specific landscapes and architecture. Its central idea is that greater connectivity between people and place is achieved through the active use of measure, not just in the initial stages of site mapping, but throughout the entire process of design, construction and inhabitation. This paper reports on how a broad range of measures—from the intuitive to the ‘high tech’—have been employed over several years to map, design and make two site-specific inhabitations on the south coast of Western Australia.²

The first claim of this hypothesis is that landscape, design and inhabitation are all processes that unfold over time—they are by nature peripatetic. The second claim is that the conventional design process prohibits greater engagement with landscape because it excludes temporality. It is a linear, prescriptive process and by the time a building is constructed, the site conditions for which it was designed have changed. The conventional process of site measure, then design, then construction,

then inhabitation assumes constancy: that the initial conditions at the time of site measure, endure through to the making (and the using). It ignores a fundamental attribute of landscape: sites constantly change as does our perception and understanding of them—in fact it is hard to imagine a reciprocal relationship which is more unpredictable.

The third claim relates to a conceptual flaw which has arisen in recent architectural design practice. This is the growing misconception that direct transfer is possible between drawing and building. The myth of direct transference is borne out of the increased use of the technologies of computer aided design and manufacture (CAD/CAM), wherein designers assume that their digitally crafted, virtual artefacts can be transferred *directly* into material form. This is a misconception because aberration and the unforeseen always afflict the materialisation of ideas. But more importantly, what remains unrecognised by these designers is that their digital forms simply cannot be materialised without an intervening medium. That medium is measure.

Peripatetic Measure attempts to elevate the status of *measure* in design thinking. It seeks to demonstrate that measure is one of the key creative mediums in architectural practice—a significant third party placed between digital and material artefacts. As such, its role is not simply that of a mute *translator*, rather, I suggest, it is an active medium of *transformation*. This study is important because the in-between state which measure inhabits remains largely unexplored by design practitioners.

The applicability of Peripatetic Measure is being tested through the design of two adjacent dwellings sited within an unusually biodiverse and dynamic landscape. The study, which commenced in 2001 and is envisaged to continue beyond the completion of my PhD in 2007,³ aims to provide an applicable methodology for architectural and landscape



Figure 1. Location of Point Henry



Figure 2. Study site on Point Henry

architectural design. It is thus 'grounded' within the real conditions of a developable site.

The site lies on Point Henry Peninsular, a remote subdivision located halfway between Albany and Esperance on the south coast of Western Australia (figures 1 & 2). Botanically, this area is comparable to the nearby Fitzgerald River National Park which is renowned worldwide not only for the number of its species but also for its high percentage of species *endemism* (over 100 plant species in the park are found nowhere else on earth). My site, which consists of two neighbouring development lots, has a total area of eight hectares (fig 3). The principal vegetation is a low-lying coastal heath which was incinerated by bush fire in late 2003 (fig 4).

Botanical surveys since the fire attest to the botanical richness of the site where 110 species have been identified to-date.

Like many remote, temperate locations around the Australian coastline, Point Henry has generated a pattern of inhabitation which is peripatetic by nature. Small 'unofficial' structures such as caravans, tents, lean-tos, and sheds provide temporary accommodation prior to the main residence being constructed several years later. Additional ancillary structures are then erected to accommodate the increasing numbers of visitors. My design brief takes its cue from this pre-existing pattern: one of unfolding growth. It does not pre-empt a



Figure 3. 8 hectare site (two neighbouring lots)



Figure 4. Coastal heath

definitive, formal 'end goal' to these designs. The aim is rather that the unfolding design provides the inhabitants with a continued means of interacting and knowing their landscape. The brief exists only as an outline sketch: "the orchestration of two private inhabitations including associated infrastructure such as sheds, roads, raintanks, effluent disposal and power." The projected time period for the program is ten to fifteen years. In summary, the site and program are by nature dynamic—appropriate for the testing of Peripatetic Measure.

Time and site

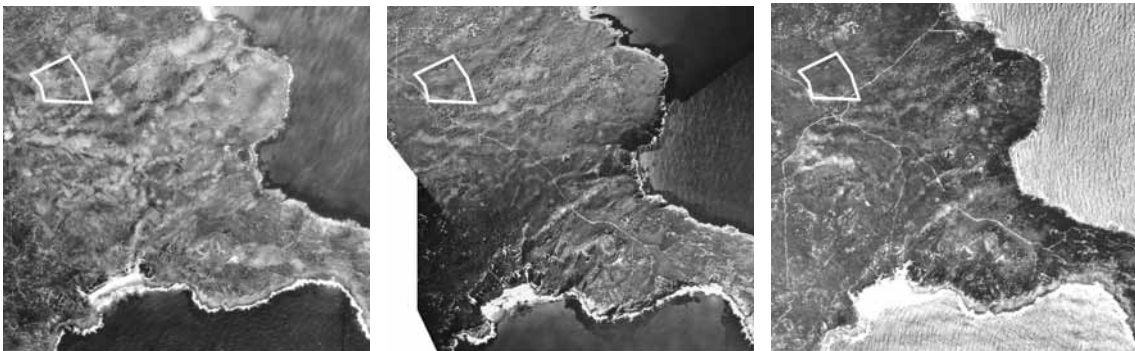
In order to explore the full possibilities of this hypothesis we first need to examine the ways in which landscape relates to time. The most obvious relationship is the time of the site itself—meaning the site's history of change, how it developed and continues to develop over time. A less recognised relationship is the time that it takes for designers to develop an understanding of site—our increasing knowledge as we measure, design, make and inhabit the site.

Our appreciation of landscapes as temporal conditions usually extends only so far as studying the history of formation of landscapes so we can comprehend their present *spatial* state. Sites are rarely viewed as continually unfolding spatio-temporal

conditions that have pace, as well as space. Carol Burns observes that site is frequently seen as a "synchronic phenomenon", that is, how it exists at one point in time. The time of the site or "the history of the setting is acknowledged only in so far as the forces acting upon it have affected the present visible form." Burns argues that "local circumstances" cannot be considered simply in terms of space; they also require a "diachronic apprehension of time."⁴

It is not uncommon for designers to understand landscape as dynamic, animate entities—acknowledging the geological or biological stories—but the temporal scale of these stories is, I argue, often too vast to engage with on a meaningful level with spatial interventions. I am indeed fortunate that naturally occurring changes in my study site, unfold at a rate which parallels my extended design and inhabitation process. Figures 5–10 are a series of aerial photographs which demonstrate the rate of change in the vegetation and human inhabitation of Point Henry from 1958 to the present, including several major bush fires, in 1958, 1997 and 2003.

In "Site Matters" a recent book in landscape architecture theory (2005), Kristina Hill discusses the non-equilibrium paradigm which has come to dominate the discourse of



Figures 5–7. 1958, 1976, 1983



Figures 8–10. 1993, 1998, 2003

ecological science. Hill argues that our concept of site needs to be entirely rethought. It should no longer be defined by geographic dimensions but as intensities of biological interactions occurring over time.⁵

The non-equilibrium paradigm—which she suggests has influenced ecology as much as the Modern Movement has design—has displaced “climax theory” which proclaimed that natural systems march towards a clear end-point or balanced climax state. Natural systems are now thought to be non-deterministic and subject to change with multidirectional outcomes.⁶ Hill argues that this temporal shift in ecological theory has important implications for designers’ conceptions of bounded geographic sites: “In the new metaphor of open systems with no steady states, bounded places must be seen as part of a changing context in which trends cannot be exactly predicted, surprises should be expected.”⁷

The implications of this for landscape architecture are that emphasis on *form* is diminished in favour of *performance*. Hill explains that what is important is a system’s ability to adapt to changing internal and external processes: “The emphasis,” she states, “is not on reaching or maintaining a certain end point or terminal condition, but on staying in the game.”⁸ The practice of landscape architecture and architecture are primarily concerned with propositions for inhabitation.

Acknowledging new understandings of landscape behaviour then must be demonstrated through enabling inhabitation to adapt to the temporal conditions of site. The key challenges that face the architect are firstly; understanding landscape change over longer durations than the diurnal and the seasonal and, secondly; developing a methodology for adaptive design. With regard to the first challenge site measurement is of critical importance.

The time of site measure

The time allocated to the measure, mapping and interpretation of sites is usually a small percentage of the time taken to design interventions for that site. It is frequently assumed that the qualities which characterise a site can be readily recorded and represented by orthodox means. Indeed, in most cases designers do not question the efficacy of conventional site measure before they commission a land surveyor to supply contour and feature information. Little time is actually spent on the site by the designer.

The process of site measure and representation is rarely considered as a creative project in its own right. The site, no matter how detailed and thorough its recording may be, is nevertheless most often viewed in respect to its ability to provide a setting, or receptacle for a future design. Sites are however, not defined places

waiting to be found. Rather, sites are as David Leatherbarrow argues, revealed through design and construction. Sites he states, “are always redefined in architectural design. . . never is the site of design ‘given’.”⁹ The activities of representation, intervention and inhabitation all contribute to the founding of sites.

When one begins to appreciate the site as a project in itself one’s focus shifts from the end-game of formal architectural design to the spatio-temporal nature of the site. In Martin Hogue’s review of approaches to site taken by American ‘Land’ and ‘Earth’ artists, he writes: “there is a conceptual elegance to the idea that a site can be a project in itself. One can design with a sense of time and change in mind, rather than follow the logic of the term *project* that in architecture suggests a more arrested state of things.”¹⁰

The problems with existing conceptions of site mapping are two fold: firstly designers consider their sites not as creative entities in their own right, but as given conditions, lying in wait for inhabitation. And secondly the measurement methods which are employed to understand sites place too much emphasis on the metric and not enough on the poetic. Designers increasingly view sites through the lenses of objective knowledge—lenses which favour the spatial over the temporal and the empirical over the expressive.



Figure 11. Gneiss orientation.

One of the central themes being tested in my thesis is that a designer is more able to achieve greater resonance between site and inhabitation by creating their own unique representations of sites. Along with Peripatetic Measure the other principal theme of my thesis is “Enacted Cartography” which refers to the designer’s direct engagement with the instruments and activities of measurement.¹¹ What follows is a chronological report on the mapping activities I have personally conducted on my study site over the last four years.

Land as a measure of itself

In my first mapping exercise, a simple hand-held global positioning system (GPS) was used to map the orientation of geological strata of Point Henry (Fig.11). Prior to this exercise a geo-referenced CAD drawing was prepared containing all available spatial data on Point Henry including an ortho-rectified aerial photograph, topographic contours, cadastral boundaries and a land-satellite file. The mapping exercise revealed a previously unseen characteristic of the greater landscape system: the orientation of rock crevices, which continue for kilometres, matched both the angle of the prevailing W-S-W winds, and the direction of the most scenic views from the site—an adjacent peninsula seen across the bay (fig. 12).¹²

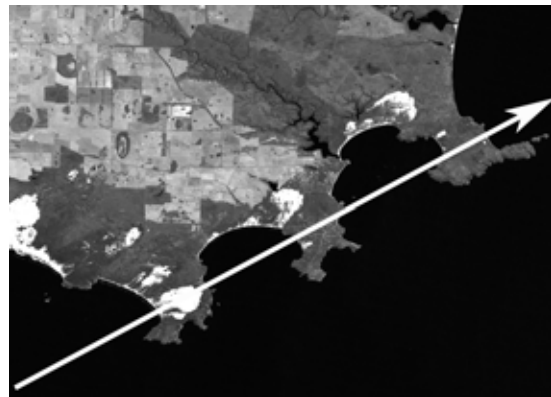


Figure 12. WSW wind, gneiss and view orientation.

Metrical measure

In the second exercise I utilized a Real Time Kinematic Global Positioning System (RTK GPS). This technology offers designers the ability to conduct their *own* detailed surveys of landform and features. RTK GPS is a two-part system comprising a base station transmitter (set up over a known survey mark, fig.13) and a roving hand-held receiver/data logger (fig. 14). Unlike other GPS systems (handheld or differential) this system is accurate to +/- 20 mm in x, y and z axes (eastings, northings and elevation). In a two day period, 2000 points were logged over four lots—an area of sixteen hectares. This data was then processed into 500 mm contour intervals using Autodesk Land Desktop (fig. 15). Following this process,



Figure 13. RTK GPS Base



Figure 14. RTK GPS Rover



Figure 15. 500 mm vertical interval contours

possible building envelopes became more defined and were subsequently surveyed with the RTK GPS at the higher resolution of 100 mm vertical intervals. (fig. 16&17).

Representational measure

The third mapping exercise, conducted in collaboration with the School of Spatial Sciences at Curtin University (WA), employed the developing technology of Terrestrial Laser Scanning. The expense of terrestrial laser scanners and their complex operation presently prohibits most designers from utilising this technology—nevertheless its potential influence upon site measurement is considerable. The instrument projects a radial array of laser light pulses onto the site and is capable of recording the colour and coordinates of over one million points per scan (fig. 18). Scanners are usually employed in 'reverse engineering' projects, whereby multiple scans of a built form are combined to form 3/d CAD files (the production of as-constructed drawings of petro-chemical installations is one common use).

In this exercise the instrument was used to measure the structural change in the coastal heath which was incinerated by bush fire in 2003. To my knowledge terrestrial scanners had not been used for this purpose before. Figure 19 shows a scan 'scene' in its raw state;



Figure 16. Envelope surveys for dwelling 1 & 2

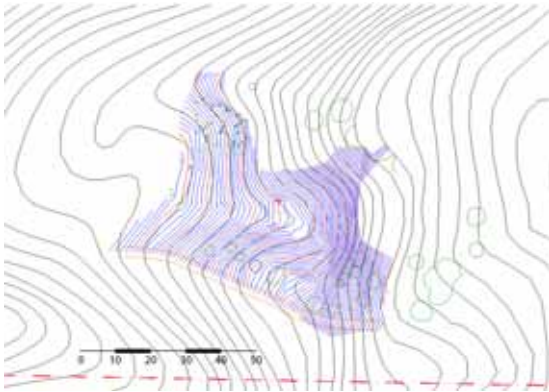


Figure 17. 100 mm vertical interval envelope survey for dwelling #2

as a three dimensional milieu. This scan, which was recorded in 2001, was then sectioned into one metre wide slices. Figure 20 is a side view of the slice. Following the bush fire in 2003 the scanner was set up on the same control points and the heath recorded again (fig. 21).¹³ By converging the two sections together (fig. 22) one of the principal characters of the site is revealed: that the heath forms a dense 'second terrain' over-layering the ground surface. The implication of this for architectural design is that this, albeit ephemeral, terrain might be articulated in the same manner usually reserved for the ground. That is, the heath might be cut

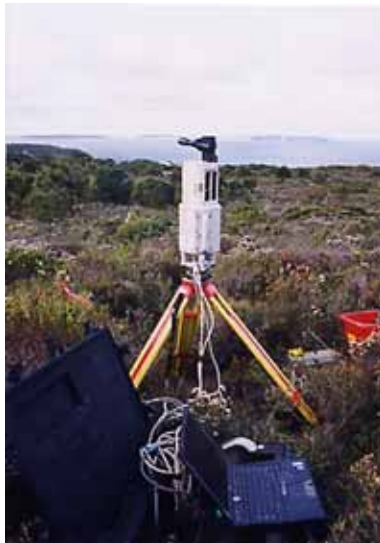


Figure 18. Terrestrial Laser Scanner



Figure 19. Laser scanning 'scene'

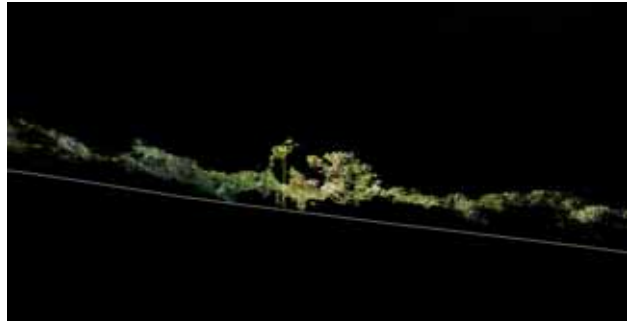


Figure 20. Sectioned scan taken before the fire



Figure 21. Sectioned scan taken after the fire

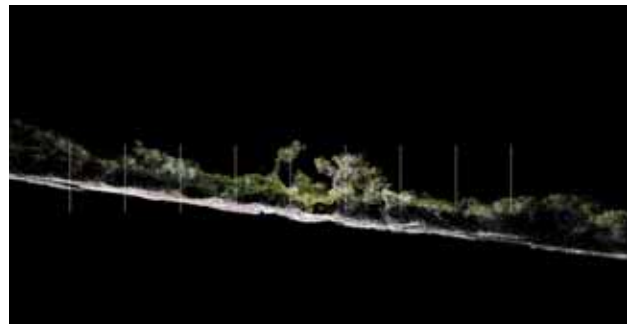


Figure 22. Merged sections

and filled, retained and so on to achieve greater engagement between architectural enclosure and site (fig. 23).

Models as measure

Laser scanning's advantage is also its drawback: its record of a site is so data-rich that it is difficult to comprehend. The data requires further abstraction. Figure 24 shows a series of cross sections cut through the scan data at



Figure 23. Design tests with sectioned scan—two terrains.



Figure 24. Sectioned scans at 10 metre intervals.



Figure 25. 1:100 model of sectioned scans and dwelling #1

ten metre intervals and on the same orientation that was found in the first mapping exercise (W-S-W).

The site model depicted in figure 25 shows a preliminary design for dwelling #1. This model attempts to materialise the effect of the prevailing W-S-W wind upon the vegetation of the study site. However, after spending two years on the site the relationship of wind to the heath was found to be more complex than evident from my initial observations.¹⁴ This has been made evident by mapping the regeneration and spread of colonising species following the bushfire. Figure 26 is a map of the major plant associations of the site conducted in 2004. It indicates the relationship between landform, wind and botany. The ridges of the site, which are exposed to the W-S-W wind, influence the spread of species along this axis. The map reveals however that another wind which prevails from the south east has similarly affected plant propagation in ridges facing that direction.

Inhabitation as measure

Most of the measures reported on above are measures of the site itself. They aid considerably in the reading of the spatial and temporal characteristics of the site and greater landscape, and in many cases they stand

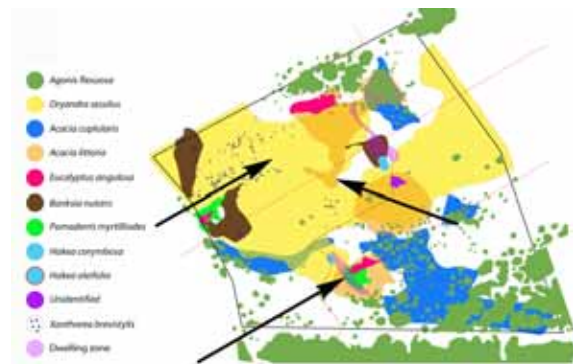


Figure 26. Major plant associations and their wind affected distribution

alone as graphic representations.¹⁵ Yet, when it came to the actual design of structures for dwelling #2 I found that contrary to their apparent richness they provided an inadequate 'foundation' upon which to investigate and construct design. In order to understand the relationship between the two vastly different scales of architecture and landscape I had to return to the site to construct full scale physical installations.

The first of these installations were simple contour lines (fig. 27) and transects (fig. 28). The site is disorientating; an even swathe of coastal heath densely covers a weathered, undulating terrain. There are few dominate markers which might otherwise provide a sense of scale and thus facilitate navigation. In landscapes such as this small interventions dramatically affect the reading of the sites and therefore subsequent inhabitation.

Proprioception as measure

The next phase of these interventions involved the erection of full-scale scaffolds and frameworks to test the siting of dwelling rooms. These rooms are configured as a string of detached pavilions as shown in diagrammatic form in figure 29. Unlike the preceding exercises which employ empirical, metrical measures, this arrangement resulted from measures best described as 'proprioceptive'—through the bodily sensing of visual and physical stimuli.¹⁶ The arrangement was informed by a range of experiences including: the visual observation of the immediate plant life found 'underfoot' (a qualitative and quantitative assessment); the 'sensed' angle of orientation that the standing body repeatedly took when looking out to sea from each (future) pavilion site; the sense of privacy and enclosure that the landform provided, and, the landform gradient as experienced through walking.



Figure 27. Site installation: Horizontal contour through site



Figure 28. Site installation: Transect on WSW wind alignment

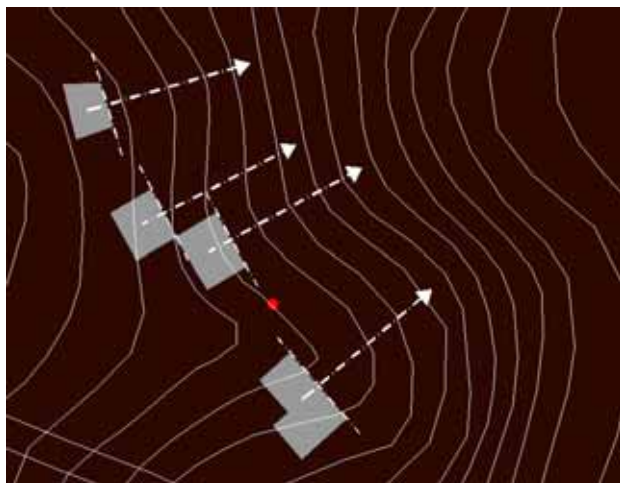


Figure 29. Pavilion orientations

Once erected, the scaffolds were surveyed using a total station (fig. 30),¹⁷ and then mapped onto the multilayered CAD file. This is the first moment that measurement has applied to something constructed on the site, thus

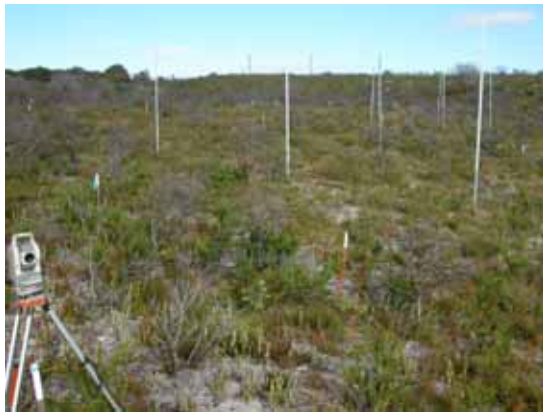


Figure 30. Total Station survey of pavilions

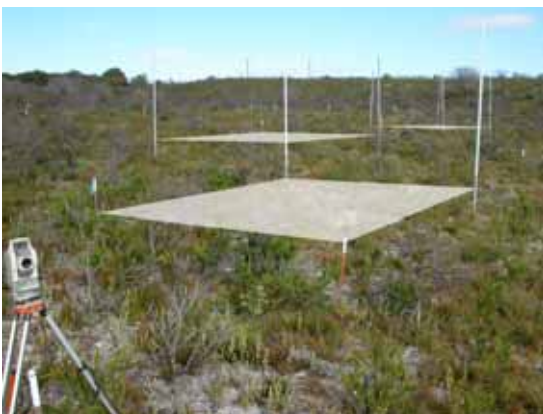


Figure 31. Pavilion visualisation



Figure 32. Pavilion visualisation

reversing the normal process whereby designs are usually drawn at scale and *then* set-out on site. Prior to this exercise the design had yet to be drawn. (Figures 31 & 32 are visualisations of the configuration of the dwelling platforms as pegged out on site).

Key concepts can be drawn from the design process leading up to this point. Firstly, site mapping is itself a form of inhabitation. When the designer conducts their own site mapping not only do they gain greater knowledge of the site simply by being present but they begin to appreciate the reciprocal relationship between the *representation* (the map) and the *real* (the subject mapped). When operating instruments such as the RTK-GPS this reciprocal relationship is very direct. For example, I found after several hours, that the most efficient way to map the landform was to record the articulations in the land surface, in other words, *its differences*. Importantly these differences were differences perceived by myself, not the instrumentation. I *saw* horizons, I *felt* ridges, I *sensed* enclosures and orientations. Consequently, the intensity of the measurement reflected those qualitative aspects of the site.

Metrical measures such as RTK-GPS and Terrestrial Laser Scanners favour the quantitative and the spatial. What is usually lost in the process of measurement is the phenomenological—the qualitative and the experiential. The above exercises demonstrate ways of reintroducing the phenomenological to measure. The site interventions, for example, are effectively lines taken from the map and erected on site and as such they blur the distinction between the representational and the real. Not only do they provide orientation aids as discussed above, their fixity becomes a foil to the changing conditions of the site. Successive spatial changes in the regenerating vegetation are made visible due to the stasis of the installations, thus increasing the awareness of the site as a dynamic condition.

The perpetually redefined site

Much of the writing on contemporary landscape theory reminds us that “landscape” and similarly “sites” are cultural constructs: they are brought into being—and are therefore inseparable from—their representation. When so called ‘green field’ sites, such as my study area are measured, the subject of the measure is usually the found condition of the site. That then becomes the representational ground upon which design is formulated—effectively placing ‘two degrees of separation’ between the site and the future building. This distance is collapsed when full scale inhabitation mock-ups and the site are mapped as one.

David Leatherbarrow observes that our tendency to view sites as given conditions, taken at one point in space and one moment in time, stems from misreading “topography” as “landscape.” He writes:

Conventional studies of sites or regions seek to discover and describe conditions as they are. In most of these we envisage or aim at some kind of picture, which is why we speak of landscape rather than land. Both the aesthetic and scientific views are inadequate to the vertical depth of the topography insofar as they target objectlike phenomena only.¹⁸

Leatherbarrow elucidates a broader understanding of ‘topography’: like ‘landscape,’ ‘topography’ is also a cultural construction. But for Leatherbarrow it comes prior to ‘landscape’, because unlike landscape it retains both spatial and *temporal* dimensions—the temporal dimension is lost through the objectification that characterises ‘landscape.’

James Corner, landscape theorist and practitioner writes of the need for landscape architects to move away from the sedimented idea of landscape as a pictured scene (“landskip”). He argues that, historically, the representations of landscape which correspond

to sustainable inhabitations, or “*landschaft*,” are not concerned with the *appearance* of landscape, but with its *performance*—the interwoven relationship of people and place over time. He states: “In the working *landschaft*, performance and event assumes conceptual precedence over appearance and sign.” The emphasis in representation “shifts from object appearances to processes of formation, dynamics of occupancy, and the poetics of becoming.” He concludes:

Thus, if the role of the landscape architect is less to picture or represent these activities than it is to facilitate, instigate, and diversify their effects in time, then the development of more performative forms of imaging (as devising, enabling, unfolding techniques) is fundamental to the task ... [t]he question, then, concerns not so much the kinds of images designers should work with but rather what kinds of imaging *activities* should be developed and advanced. I am referring here to the actual durational experience of mapping, drawing, modelling, and making as a generative sequence in creative thinking and picturing needs to be made.¹⁹

As the above projects have shown, the greater time taken to map sites the more evident performative phenomena of those sites become. Readings of landscape *change* begins to dominate over readings of landscape *form*. Leatherbarrow points out that if a building is to sustain itself over time then “the patterns and the impromptu performances of the landscape must be acknowledged.”²⁰ If the key to sustainable architecture is its ability to adapt to change then the question remains “how might designers account for future change which is by nature, unpredictable?” Fundamental to this question is our conception of the relationship between site and temporality. We need to think beyond the idea that the space of a site simply

changes over time, and consider the notion that sites have *duration*.

“Duration” versus “History”

Reflecting on my project to-date the unfolding process of mapping, design and inhabitation has *paralleled* the unfolding of the site itself. My process has intercepted and interwoven with the site's processes of regeneration. The key challenge then is to develop a design methodology that will continue this reciprocal relationship, between inhabitation and site, indefinitely. All sites have speed and they have pace but do we have the means to firstly, 'see' that temporality and secondly, engage with it at the level of architectural and landscape architectural design.

In 2005 I initiated a photographic art project for the Perth International Arts Festival called “Lightsite.”²¹ This involved the installation of

a room-sized camera obscura in six different sites throughout the Great Southern region of Western Australia (figs. 33 & 34). Lightsite is an attempt to fuse the two dominant means of landscape representation: landscape as pictured scene (*landskap*) and landscape as lived experience (*landschaft*). At each site, a local inhabitant with a strong connection to that landscape was photographed inside Lightsite with a conventional SLR camera taking five minute exposures. The project seeks to represent not so much people or their place specifically, but rather *connectivity* between the two.

Lightsite was erected on my study site in December 2005 (fig. 35) for the purpose of celebrating the connection my botanist, Barb Miller, has with her landscape (fig. 36). The *only* light entering the room was through a small aperture placed in one wall. Figures 37 & 38 depict the words “Hotspot” and “Time” which are written with torch-light during the five minute exposures. Computers were not used in the creation of any of these images—the SLR camera has simply recorded all ‘visible’ events occurring within the camera over a duration of five minutes.

Lightsite uses time itself as a medium. The images result from the cumulative effect of light working on the transparency film

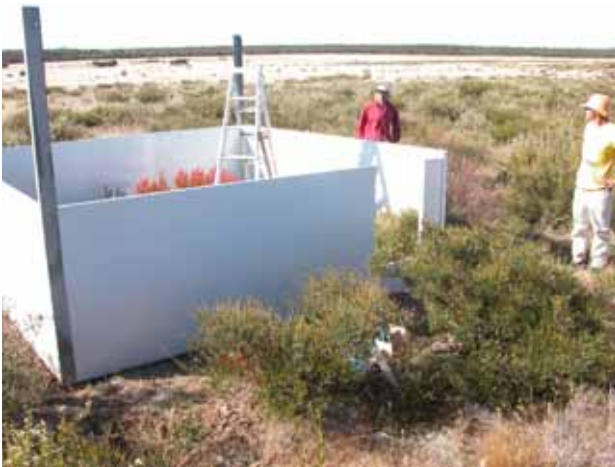


Figure 33. Lightsite under construction

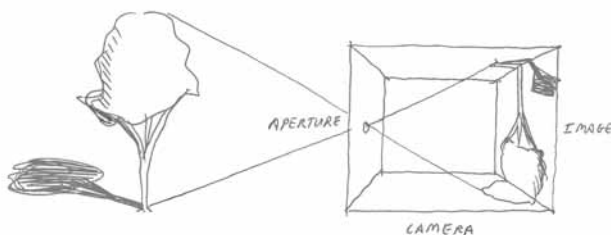


Figure 34. The camera obscura principle



Figure 35. Lightsite on the study site

emulsion—over time. Although five minutes is a short duration compared to the durational scale of landscape, the affect on the subjects when they inhabited Lightsite was profound. They found (after their eyes adjusted) *their* landscape revealed as just pure light—it was stripped of its materiality. As enigmatic as these images may be, Lightsite remains purely a representation of duration—it is not *propositional*. That is, unlike construction drawings, diagrams, instructions and musical notations—it cannot instigate effects over time. While it is valuable for its interpretational poetics, it is not a method that can bring matter or performance directly into being.

Projecting duration

In order to develop a propositional methodology for durational design, it is important to critique projective drawing, the dominant propositional medium in architectural construction. Projection infers a direct transmission from site-to-drawing, and from drawing-to-building. The survey drawing is projected *from* the ground, and the construction drawing is projected *onto* the ground.²² Thus, the projection drawing spans both knowledge (representation) and creation (proposition).

Corner argues that the architectural projection drawing, (plans, sections and elevations) have become merely mute, instrumental documents when compared to the descriptive power they held at the time of Vitruvius. He says “[t]he Vitruvian ‘ideas’ were less graphic conventions than conceptual strategies analogous to the reality of execution.” Where projective drawings were once open to interpretation, they have since degenerated into prescriptive recipes for thoughtless and trivial production. Construction has become increasingly subservient to projective architectural drawing. The significance of this problem is noted by Corner who states: “the purely procedural techniques of modern day projection drawings tend to alienate both the designer and builder



Figure 36. Five minute exposure of Barb Miller taken inside Lightsite. (Lightsite does not have a floor)



Figure 37. Lightsite is part of the Hotspot Cultural Project.



Figure 38. “Time Alone” Five minute durational photograph.

from a synesthetic and hermeneutical mode of making and knowing.”²³

By maintaining prescriptive authority over the built work the projective architectural drawing has become closed to outside influences. Survey, design and construction are set in a one-way, linear process. Unforeseeable conditions such as error and epiphany (for both designer and builder) are excluded from articulation within the built form. The projective drawing is therefore one of the least capable methods of realising temporally responsive design.

A more relevant propositional system for time-based landscape architectural design is a notational score. Notations take many forms, but those developed in dance, theatre and film have particular relevance because they are instructions for enacting performances rather than making objects. In notational scores the element of time is always present.

The landscape architect Lawrence Halprin devised a propositional system of notation as a way of literally choreographing design. With this method he orchestrated a range of projects including suburban developments, fountain designs, and community decision making. Halprin understood that scores can be absolutely controlling or they can allow freedom and accident. He derided the conventional scores (plans etc) used in architecture. “The modern building” he states, “is a predetermined event... the score controls absolutely, with assembly line logic.”

Halprin's system, which he called “R.S.V.P Cycles,” retains a more ‘open’ form of control. The score (“S”) is just one part of a non-linear process that includes: Resource (“R”), referring to program and site; “Valuation” (“V”), value judgments and feedback; and Performance (“P”), the form or the realisation of the process. The key characteristic of RSVP cycles is “response” or feedback.²⁴

Halprin saw his system as analogous to ecological principles. His motivation was to develop a propositional system that like ecosystems, was process-oriented rather than goal-oriented. He observed that the balance of climax communities in natural and human communities is tenuous and easily destroyed. Consistent with developing theories of “non-equilibrium,” Halprin recognised that ecosystems do not aspire to an end point: “one of the greatest dangers we experience is the danger of being *goal-oriented*,” he writes ... the goal approach “is an oversimplified approach ... it is the doing that we all enjoy and which is meaningful to us.”

Halprin recognised that feedback is an essential ingredient of both creative projects *and* natural systems. An idea is posited, then realised and then judged; then the idea is developed further and so on. In the conventional process of architectural design, feedback is excluded once construction documentation commences. In this way unforeseen future conditions and opportunities are similarly excluded from the process of realisation. The ultimate test of the design, for example, its inhabitation, is not performed until the project is completed. The potential of notational systems such as RSVP Cycles is yet to be fully explored in landscape architecture.

Since Halprin's time, digital media has developed in the design and construction industry which, contrary to its promise of enabling greater responsiveness and collaboration, has in fact closed out feedback from within the realisation process. Temporality is excluded because such control effectively prohibits the creative process from engaging in the dynamic conditions of the site and the construction process. The willingness of designers to exercise such control is all the more surprising given that one of their prime intentions is often to represent movement and time in their forms.

Two of the main new areas of research into architecture's relationship with time are "real-time response" and "animate form" (my terms). A recent example of real-time response is the much celebrated "Aegis Hyposurface" by the Paris based group dECOi. This project, perhaps better described as an installation, features a faceted surface which responds to aural and motion stimuli in real-time via the computer-controlled articulation of thousands of hydraulic pistons. Many designers aspire to achieving real-time response in their buildings, whether through the constant manual articulation of sunshades, for example, or more 'high tech' automated responsive systems. But to call such designs time-like is, I argue, a fallacy. Such projects—and Aegis Hyposurface is exemplary of these—do not effectively manifest temporality because their primary state of being is actually fixed. They are constantly stuck in a state of response and return, response and return, ad infinitum.

The second method is more facile than the first for "animate form" involves the mimicking of dynamic process in *static* form. Forms which either *look* like they are moving, or appear *frozen* like three dimensional cinematic "stills" of moving objects. The architecture of Greg Lynn, Ali Rahim, Kolatan & MacDonald, Kas Oosterhaus and Lars Spuybroek, spring to mind.

Instead of attempting to mimic an animate being through cinematic illusion or real-time effects Peripatetic Measure manifests temporarily through a process more akin to evolutionary biological adaptation. A building doesn't merely change over time within its site, but the entire creative act of conceiving and making evolves and adapts spatially and temporally.

Peripatetic measure applied

Landscape architecture can contribute greatly to endeavours in registering temporality

because landscape itself is perpetually in a state of becoming. However, both the architect and landscape architect suffer the disadvantage of not having direct creative access to their 'work.' Unlike the painter or sculptor who works directly with the object of their thought, the architect must work through an intervening medium.²⁵ The disadvantage lies in the fact that the act of making is in itself a hermeneutic process, a process of learning. The direct tactile engagement with materiality activates discovery and revelation. Ideation and making thus enfold within each other as the form evolves in an unpredictable, peripatetic manner. For the landscape architect, making has particular significance because, as my mapping exercises have shown, the construction of built form within landscapes changes our perceptions and patterns of inhabitation at a fundamental level. Simply put, making affects reality in ways that cannot always be predicted, it is therefore an imperative that designers have greater access to the process of realisation.

The future tests of Peripatetic Measure on my study site will involve the use of CAD/CAM technology to design, measure and construct built form. CAD/CAM is increasingly misconceived as a means of achieving "vertical control" over the design and construction process. Vertical control implies a linear process wherein digital form can be transferred unaltered into material form and visa-versa. This a misconception because firstly; error always conditions making, and secondly; the actual means by which the form is transferred from digital to material is through the intervening medium of measure. I suggest a more appropriate conception of this computer-linked process would be CAD<Measure>CAM.

'Peripatetic Measure' proposes an active use of the medium of measure, where its role is not merely in construction control but repeatedly feeds-back information on contextual changes to the design and manufacture process. When

linked to CAD/CAM process, Peripatetic Measure gives the designer the potential to respond to unforeseen events such as material distortion during construction. By implication this methodology contests the need to construct complete artefacts in digital form and then transform them to the actual. Instead, feedback loops between the actual form and digital model enable the designer to capitalise on unforeseen, potentially fortuitous events that occur throughout the course of the project, which might be hours through to years.

Reverse engineering, for example, refers to the use of scanners, theodolites and photogrammetry to provide digital models of existing built contexts (from petro-chemical plants to toothbrush handles). These digital models then provide the 'ground' upon which further design takes place. Whilst this technique suggests a reversal of the usual flow, i.e. from actual (back) to virtual, it is rarely employed after the initial survey.

Although it falls short of the level to which I believe a peripatetic methodology of measure might be employed, the Greater London Authority Building (GLA) by Foster and Partners, provides one example where measurement technology played an active role within the construction/design process. The structural frame of the GLA is comprised of bolted steel elements, each unique in dimension, fabricated using Computer Numerically Controlled (CNC) processes. Importantly, these elements were manufactured (in the workshop) *during* construction.²⁶

3D Total Stations are capable of measuring to sub-millimetre accuracy, within a range of 100 metres. These instruments were used to repeatedly construct digital models of the steel structure as it was erected. At each stage of construction these models were compared to the structural engineer's digital, design models. Often, the position of the structural frame differed from the design model. After assessing

that these inaccuracies were not too great as to affect the principal structural design, the steel elements for the next stage were constructed to fit this new, measured, context.

The GLA's utilisation of the CAD<Measure>CAM feedback loop applied only to structural engineering aspects of the project. That is, the as-built internal structure alters from the original design whereas the envelope of the building 'arrived' at its predetermined form. Like much of recent architecture that employs computer-aided design and construction, the GLA reveals the designer's primary concern is for control over the visual qualities of shape and form. Material is willed to fulfil a pre-determined geometry. A more open process would enable the embodiment of error, and accident and revelation in the final form.

Proof of concept test

Peripatetic Measure's applicability as a propositional system is presently being tested in the design of dwelling #2. It is envisaged that the design and realisation process will continue for at least fifteen years. Like Halprin's notational system it has no "end game." That is; a final, formal destination is not envisaged for the project. Measurement's role in the exercises described above has primarily been analytical and representational. Herein measurement takes a more active role in form creation.

In order to challenge the conventional linear process of architectural design, the distinct acts of "measure", "design", and "making" have been intentionally blurred in dwelling #2. Site measure is continuing well after design has commenced, and construction has started well before completion of the design. The design of the dwelling has been delayed for a number of reasons: Firstly, the entire process of realisation is left *open* to unforeseen events. Design deals with these opportunities and constraints when they arise. In this way, greater creative

access is given to the actual work of building. Secondly, after many months of designing in the conventional manner, through projective drawing, and digital and material models, workable design solutions are yet to materialise.

We know that creative processes cannot proceed without limits. Ideas like minerals need containment and pressure to crystallise. The intention is that with an “open” strategy such as this much of the revelations that will occur throughout construction will be through direct experience of the site as it is cultivated by inhabitation. In this way the project limits are provided by the ongoing (spatio-temporal), reciprocal relationship between inhabitation and site.

In summary, the main attributes of Peripatetic Measure are:

Peripatetic Measure is at once analytical and propositional: Unlike “plans” which are prescriptive drawings Peripatetic Measure is an operational “plane.” Analytical information (eg site surveys) can be projected *onto* this plane, while propositional information (designs, construction details) can be projected *from* it. It is a tool for both knowing and creating.

It is a medium of translation between idea and conception. It deconstructs the intervening medium that separates the designer from the object of their thoughts—“the work.” Measure allows direct access to “the work”—meaning, both the built form as a material entity, and inhabitation as temporal experience.

It is an agile rather than prescriptive methodology. Modifications can be made *during* design and construction based on the new conditions created *by* design and construction. Such agility is an important faculty of living organisms: it is not the physically fittest, or the smartest that endures, but those that are most able to adapt.

The design process opens up to the hermeneutics of landscape and making. We know that making

inspires invention. But we forget that sites themselves are continually remade, or “perpetually redefined”, through mapping, construction and inhabitation. So conceived, not only are sites part of “making,” they also provide the best test of a project.

Peripatetic Measure seeks to fuse the normally detached activities of mapping and inhabitation. It recognises that the creative process is by nature peripatetic: design proceeds through leaps of intuition and hunches just to see what happens, then, the designer reflects on those. It involves suspension of disbelief, risk and fortuitous events taking us beyond our preconceived ideas. Peripatetic Measure asks “why not extend that process into site and building construction?”

Conclusion

My test of Peripatetic Measure has been conducted in very sympathetic conditions: an indeterminate brief; indefinite time constraints; and a highly dynamic, previously uninhabited landscape. This is not to say though that my hypothesis isn't grounded in real circumstance—for in order to fully test this idea I had to purchase my study site! Nevertheless, such an open program is a luxury few clients and their designers can afford. So what applicability might my study have for more compromised projects?

In landscape contexts such as my study area, I suggest it is highly applicable. Remote, unmapped and previously uninhabited landscapes are being developed for housing along the entire temperate coastline of Australia. I have found that in most instances houses are built before the site is even experienced. If site-experience *does* inflect upon design, it is only through such superficial attributes as the ocean view. This is the case whether architects are involved or not. If more enduring, sustainable relations with such landscapes are to be achieved, it is imperative that a methodology be developed which

enables site to inflect upon *all* stages of a project, not just prior to design.

The study demonstrates that measurement offers a means of inflecting design with changing site conditions. It does this initially by showing that measurement can take many forms; that it is not restricted to 'high tech' scientific measure alone. It employs: *landscape as measure*—the rock strata orientation, wind patterns and botanical regeneration; *proprioception as measure*—embodied intuition, decisions made through direct experience with the changing site; *inhabitation as measure*—building and living within the site over time; *representation as measure*—developing site-specific maps and images which affect perception and understanding of the site; and *metrical measure*—the survey of landscape and site works and the dimensional control of built form.

The full range a measurement I have outlined would rarely be employed in a single project. The landscape architect might stop short of using metrical measure, and likewise the architect, working in urban sites for example, may not employ measures of *landscape* and *proprioception*. Transcending these considerations, the study has sought to reconceptualise measure in a way that does not presuppose *precision* as its main attribute, but rather *quality*.

The whole intent of the study has been to show a means of enabling quality feedback on activities carried out on sites, whether those actions are the relatively passive acts of visitation or the more intrusive acts of construction. For feedback to occur in the first place a process must be *open* to changing conditions. Unlike the conventional linear measure>design>make process, Peripatetic Measure does not exclude the unforeseeable from being articulated in built form. New conditions brought about by such change as; the site itself (eg. new plants); inhabitation (new knowledge); design (new ideas); and building (new spaces), are able to inflect upon the built

form throughout the *duration* of design and construction.

Importantly, the applicability of Peripatetic Measure does not depend on a process having a *longer* duration. I have admitted that my test is extreme; four years to-date and no end in sight. But we must acknowledge that regardless of how *much* time a project has, its actual process of realisation—its design and making—occurs *through* time. My project's duration is extensive because its actual program is the registration of large-scale temporal change of landscape (including its inhabitation). That is just one type of change and one length of duration. The primary attribute of Peripatetic Measure is *agility* not *time*. Its primary strategy involves undermining the authority of one the fundamental conventions of design—the projective drawing. After all "not all things architectural can be arrived at through drawing."²⁷ ◦

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Endnotes

- 1 D. Leatherbarrow, (2002) "Uncommon Ground: architecture, technology, and topography," MIT Press, p.189.
- 2 "Site-specific architecture" refers to landscape interventions (buildings and site designs) that facilitate modes of inhabitation that reveal and encourage closer relationships between people and the biological, spatial, cultural, and climatic process that characterise a particular place.
- 3 My PhD is entitled "Transformative Mappings: generating site-specific architecture from the convergence of landscape, mapping and computer linked technologies." It is being conducted at the Faculty of Architecture, Landscape and Visual Arts, University of Western Australia.
- 4 C. Burns, (1991) "On Site: architectural preoccupations" in Kahn, A. (ed.) "Drawing Building Text," Princeton Architectural Press, New York, p.149.
- 5 K. Hill, (2005) "Shifting Sites," in Burns, C. & Kahn, A. (eds) "Site Matters," Routledge, New York, p.141.
- 6 Hill, p.131.
- 7 Hill, p.144.
- 8 Hill, p.143.
- 9 Leatherbarrow, p.220.
- 10 M. Hogue (2004) "The Site as Project: Lessons from Land Art and Conceptual Art" in Journal of Architectural Education, Vol No. 57, issue No.3, pp 54–61.
- 11 See Weir, I. "Enacted Cartography: testing a methodology for making site-specific architecture" in Bromberek, Z (ed.) "Contexts of Architecture: Proceedings of the 38th Annual Conference of ANZAScA conference," University of Tasmania, Launceston, pp253–260.
- 12 This is reported on in more detail in "Enacted Cartography..." (Weir, pp253–260).
- 13 Each scan is actually created by 'merging' several scans taken from control points distributed throughout the site. Fortunately these survey pegs survived the bush fire.

- 14 I purchased my study site in 2004 and have spent several weeks camping there at numerous times since.
- 15 A series of exhibitions of these maps have been held including: Gorepani Gallery, Albany (2003); Cullity Gallery, UWA, Perth, (2005).
- 16 The Oxford Concise English Dictionary defines proprioception as: "of or denoting stimuli produced and perceived within an organism, especially those relating to position and movement of the body."
- 17 A total station (also known as a "jigger") is a standard instrument for land survey. It is essentially a theodolite with built-in laser measurement capabilities.
- 18 Leatherbarrow, p.202.
- 19 J. Corner, "Eidetic Operations in New Landscapes." in Corner, J. (ed) "Recovering Landscape," Princeton Architectural Press, New York, pp159–160.
- 20 Leatherbarrow, p.200.
- 21 Lightsite photographs are presently touring regional galleries in Western Australia (through 2006–7) as part of the "Hotspot Cultural Project" initiated for the 2006, UWA Perth International Arts Festival.
- 22 J. Corner, (1992) "Representation and Landscape" reprinted in Swaffield, S. (ed, 2002) "Theory in Landscape Architecture" University of Pennsylvania Press, Philadelphia, p.150.
- 23 Corner, p.152. Corner borrows the term *hermeneutics*—which refers to the art of interpretation of liturgical texts—and recasts it as a means for landscape theory to transcend "pictorial image and historical style." He argues that the landscape is itself a hermeneutic medium. See J. Corner (1991) "A Discourse in Theory II: Three Tyrannies of Contemporary Theory and the Alternative Hermeneutics," in "Landscape Journal", v10, pp 115–133.
- 24 RSVP, abbreviated from French, meaning: "please respond."
- 25 R, Evans, (1986) "Translations from Drawing to Building" in "AA Files: Annals of the Architectural Association School of Architecture," No. 12, London, p 4.
- 26 In Conversation with Rod Warner, Warner Land Survey Ltd, Control Surveyors for Greater London Authority Building, Tower Bridge, London. For more information on the project see <http://www.fosterandpartners.com> (Accessed 1st May, 2006)
- 27 Evans, p 5.