

## Beyond a Phenomenology of Light

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in

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In recent years, the rate of development in lighting and material technologies has increased to such an extent that the contemporary designer needs to constantly keep pace with the engineering innovations available to them. The control of light now far exceeds the specification and diffusion of appropriate lamps as new technologies such as data projection, light emitting diodes, plasma screens, optical films and sensors systems present a whole new set of parameters in the approach to lighting. Beyond the technical specification of appropriate light sources is the scope for light to engage the mind of the viewer and imbue qualities that are both beautiful as well as functional. In order to be able to employ contemporary lighting technologies a designer needs to be equipped with a sensibility that can assimilate the potentials of new lighting media and forge new and refined methods of their manipulation.

A key to the creative manipulation of light lies in the identification of the relationship between phenomena and perception. The qualities of light can only be fully appreciated when they are considered as a dynamic system. The perception of light (and colour) is a question of relativity, as the apparent affect of a lighting condition is dependent upon its relationship to the nature of the ambient light and darkness which surrounds it. Our perception of a particular hue, saturation or brightness of light is dependent on its contrasting effect with adjoining conditions. Similarly the workings of the eye and brain have the ability to manifest further gestalts, illusions and after images that can be manipulated to shift and alter our experience of a lighting condition. The potentials of manipulating that space between the stimulus of the optic nerve and the interpretation of the mind offers a new dimension in the thinking of light for designers.

This relationship between the viewer and the viewed has been closely interrogated by phenomenologist philosophers such as Husserl and Merleau Ponty<sup>1</sup>. Within phenomenology, the body and its perceptual abilities, is seen as the 'third term' between subject and object. Phenomenology lays the foundation for a view of the world where there can be no such thing as a constant set of relationships between the sensations of the external world and the internal cognitive processes of the mind. Within the edicts of phenomenology ones perception of the world is never completely constructed. The world is always in a state of becoming.

The understanding of the phenomenology of light has been the territory of the so called 'light and space' artistic movement of the late twentieth century. In the works of artists such as Dan Flavin, James Turrell and Olafur Eliasson<sup>2</sup> the subject/object dialogue is manipulated to the point where the perception of the viewer is the medium that is

being manipulated. In experiencing these works we are confronted by the heightened awareness of our own senses and the importance that our perception has in the creation of the work of art. The phenomenological affects created by such artists hold many lessons for the designer of architectural lighting installations. For students of lighting design these works provide a gateway into a deep understanding of the intricacies of shaping light and colour and the ambiguities and sensorial delight inherent within its perception. While the 'phenomenal' artists' agenda is to confront the viewer with the nature of our own perception, the designer uses 'phenomenology as a tool' in the shaping of the agendas of architectural space.<sup>3</sup>

Beyond the purely physical experience of light, lies the ability of light to be used as an expressive medium. Light's curious nature provides the designer with a powerful medium to engender warmth, safety, wonder, delight and drama. This shaping of a spatial experience through the manipulation of light must be considered as a response to specific places and spaces as it involves the interpretation of the qualities of light in context to the cultural, programmatic, functional and expressive focus of a particular design. In considering the orchestration of light within architectural spaces, the designer's brief and approach to the project needs to provide the framework for the contextualizing of one's physical experience to a specific site, program and expectation. The comprehensions of light that a designer brings to a project must encompass the physics, psychology, artistry and technical scope of light. The designer must appreciate the aesthetic and phenomenological concerns embodied within contemporary art practice and interweave these with the potentials that new technologies offer while developing strategies for the codification of light's qualities so that they form a vocabulary that can be used as an expressive medium within a specific design context. In the projects presented here, the development of architectural design briefs that are based around the 'ordering of light', are used as a mechanism for learning and discovery by engaging the student designer actively in the complex knowledge base pertaining to light, through the production of resolved design proposals.

#### Subtractive / Additive

'Colours are the deeds and sufferings of light, the deeds and sufferings of light with darkness'.<sup>4</sup>

Goethe

The comprehension of subtractive colour theory, where the primary colours of Cyan, Yellow and Magenta are mixed with black and white to produce tonal variations used in the printing, painting, coating and dyeing of surfaces are usually commonly understood by design students. These principles are taught from an early age through conventions such as the colour wheel, with its primary colours of red, blue and yellow and complementary colours of purple, green, and orange. Most young children learn this at an early age through the use of water colours and poster paints. The development of these perceptions in design school training has in the second half of the twentieth century included an introduction to the Munsell colour system and its concepts of hue, value and chroma and the adoption of Bauhaus pedagogy as taught by Kandinsky, Klee, Itten and Albers in which the concept of simultaneous contrast of colours exposes students to an appreciation of colour harmonies and discords. The perceptual affect of such contrast were extended to encompass the field of gestalts, illusions and afterimages in the work of the 'OP' artists which expressed a specific understanding of the dynamics of relative colour to create a 'third affect' that seemed to exist

somewhere between the picture plane and the viewers perception. However a more profound appreciation of the subtleties of colour theory can be elucidated by showing students the work of artists such as Turner, Monet, Seurat and Rothko as examples of the refined sensibilities and personal approaches to pictorial and chromatic composition within the history of art.

While much work has been done in the twentieth century on the development of subtractive colour theory as a guide for artist and designers, a similar creative theoretical position has not been established for the understanding of additive colour, where the primary colours of Red, Green and Blue are mixed in different intensities to create the spectrum of coloured light. While such training has usually been restricted to the realm of theatre lighting design, with the revolution taking place in computer and television screen technologies and RGB Light Emitting Diodes, the comprehension of the potentials of additive light affects is now an essential aspect in the education of designers whose practice involves the shaping of the qualities of architectural space.

To come to terms with such phenomena and the manipulation of artificial light students are asked to consider Goethe's postulations that 'light is the equal partner of darkness'. Goethe pictured that light and darkness relate to each other like the north and south poles of a magnet, and that colours arise at the borders where light and dark meet. In this thinking darkness can be seen to weaken lights power and conversely, light can limit the energy of the darkness. So it is possible to think of yellow as a light which has been dampened by darkness and blue is a darkness weakened by the light. In negotiating the boundary between darkness and light, a designer needs to adopt an outlook that understands that white light (be it natural or artificial) obliterates coloured lights intensity and that darkness provides the perfect backdrop from which to achieve the full depth of projected colour. Between these two extremes lies the ideas of colour emerging from darkness and that colour can be manifest as a shadow within a field of light.

With an understanding of the dynamic interplay within the realms of additive and subtractive light the field becomes even more complex when their qualities meet, as in the case in most architectural spaces. In a project entitled 'Perceptual cells' students are asked to address the potentials of the projected light of additive colour (red, green, blue) and the subtractive colours of paints and surfaces (cyan, magenta, yellow) with subtle and knowing manipulation to enhance the experience of everyday spaces. The project is structured around the idea of a living room within a house that can be oriented in particular ways to the path of the sun. The students are asked to spend the semester exploring different scenarios in which the way the nature of the ambient light in the room can be balanced in relation to the time of the day, the nature of apertures in the external walls, the hue, and colour temperature and positioning of artificial light and the surface treatment of the walls. This is done through the production of a series of test rigs that are built at a scale so that they match the size, shape and depth of field of a Single Lens Reflex camera. These 'perceptual cells' are devices in which light can be mediated and manipulated to create a variety of affects. The cells need to be designed to respond to a range of natural light conditions and different artificial light sources and must be carefully calibrated in order to produce exact optical affects. Ultimately the cells expose how a spatial mood can seem to change and transform as its walls, floors and ceiling react to the colour temperature and colour rendition of specific light sources which include sunlight, RGB LED, incandescent, fluorescent and dichroic lamps.

The lighting for the Hybrid Objects exhibition at the Melbourne Museum in 2005 provided the opportunity to enact these ideas on the dynamics of light and colour on a grand scale, in collaboration with the museums technical staff and with access to a high quality computer controlled lighting system. The lighting for the exhibition attempted to create a zone of space that was distinctly different from the permanent display areas of the rest of the museum. As one entered the gallery space you were assailed by the subtle yet dazzling sweep of colour. Each wall and alcove was lit with a different hue of light which was precisely masked to create crisp edges on the corners where two colours met. Turning around in the space would elicit a momentary tingle of after image as one's eyes adapted from one colour to its complimentary. Lighting pieces in the exhibition were placed to balance their colour temperature with the effects of the luminous interior. The furniture and artworks were distinguished from this field of colour through the use of carefully focused and shuttered spotlights. A number of pieces were placed in colour fields that were the complimentary colour of the material from which they were made. These pieces appeared neutral grey when left in the wash of opposite colour, however when lit by a focused spotlight they would seem to glow in sharp contrast with their surroundings, in a stunning alchemy of additive and subtractive colour. The overall affect was an otherworldly experience in which the subtle optical effects of the background lighting worked in concert with the desire to draw the viewer to the objects on display.

Material / immaterial

'Space emerges where material aspects dissolve'<sup>5</sup>

Zen proverb

The twentieth century has marked an era where the popular conception of the nature of the physical world was radically altered. In science the quantum notion of light being both a particle and a wave simultaneously and the idea that matter equals energy (and vice a versa) fundamentally shifted the foundations of physical thought. Concurrently developments in structural and material technologies transformed the approach to building within the twentieth century, in which the application of glass curtain wall systems saw the imposing stone solidity of nineteenth century cities replaced by transparent and translucent cityscapes we know today. Seen together these revolutions in the realms of scientific thought and the physical realm constitute a dramatic shift in the paradigms of how we conceive the world and how we fashion it to reflect this thinking.

In architecture the influence of Mies van der Rohes carefully proportioned planes of glass and their juxtaposition with the rich materiality of marble and granite through elegant minimalist detailing produced an aesthetic in which architectural elements seem to float impossibly on wafers of reflected light. More recently Jean Nouvel, in buildings such as the Cartier Foundation in Paris, the 'goal is to render ambiguous the boundary between materiality and non-materiality, between image and reality.'<sup>6</sup> This philosophy and aesthetics of dematerialization has also been expressed through the use of transparency, reflection and illusion in the works of artists such as Robert Irwin and Dan Graham, in which ones preconceptions of the physical world is destabilized and brought into question and where the relationship of the viewer in the completion of a work of art becomes apparent. These approaches to art and

architecture come together in the work of James Carpenter who as an artist works closely with architects to activate and animate the viewers' experience.<sup>7</sup>

The contemporary student of design must work within this backdrop of the immaterial qualities of the modern city. In recent years, revolutions in the properties of glass and plastics and the array of dichroic, polarizing, reflective and distorting optical films and filters is almost overwhelming. In order to develop strategies for these products and an aesthetic of dematerialization that goes beyond shallow spectacle, students need to develop a sensibility of materiality and immateriality that can be used as a governing principle in the planning and programming of architectural form.

As an introduction to these concepts the 'Speed of Light' project attempted to shift students' perception of the idea of light interacting with a material, from one where light is seen as the medium being manipulated, to one where material is considered as a medium which is animated by light. In order to flip this logic the class was asked to respond to a quasi-scientific hypothesis: 'if the speed of light is a constant, then material, form and space must have a "speed" relative to a light source'. In this way the students were asked to develop a way of defining materials relative to their response to the immutable condition of light and perceive them as ethereal conductors of light rather than solid masses. This refocusing of perception in order to appreciate the affect that a material creates and the possible transformations apparent in traversing the relationship between light and materiality is an important step in moving ones understanding of the act of spatial design. It marks a move away from the conception of interior design as the arrangement objects in space to one where the balancing of energies and fields of phenomena is used to engulf the viewer in perceptual delight.

In the Twenty First Century Sublime studio the concept of dematerialization was used as a strategy to transform the foyer space of 140 William Street, an office building in Melbourne's central business district. Originally built as BHP House, the building is a classic example of a modernist steel frame skyscraper whose design was inspired by Mies van der Rohe's Seagram building. The Foyer space is a minimalist glass lined void on which the forty storey building seems to float. Students were asked to research the building's design and construction and develop an opinion about the nature of the site, the building, its history and its usage. From this position they were then asked to develop a twenty first century design response that would challenge and update the buildings mid twentieth century architecture. The students were asked to come to terms with the physical and phenomenological aspects of the site and develop techniques for their focusing and amplification. Students were asked to not only consider the phenomenal, physical and material concerns of space but include ideas around the social, cultural and behavioural aspects of human beings. These observations and perceptions were to be aligned with the specific conditions of the site and used as a mechanism for developing a brief and program for the building. The design proposals that followed sought to amplify the modernist buildings inherent transparency and relationship to the streetscape so that the foyer (used as a functional transition space by day), would at sunset transform itself in to a work of phenomenal urban art.

This nature of dematerialization and reflection can be further employed as a phenomenological approach to design which simultaneously defines and celebrates programmatic concerns. In 'Threshold', a major project design proposal by Caroline White, a glass chasm was proposed as an architectural intervention which would separate the main

terminal building with the international concourse of Melbourne's International Airport; a gateway to and from Australia. The airport is a controlled space, a space in which the traveller takes part in a ritual process; entering in order to leave. A major component of this process is the entrance into and exit from the custom-controlled areas of the international concourse—the point at which the departure lounge and the arrivals hall connect with international space. This is the moment when farewells are made, memories are packed and the emotion of reunion ignites.

The design's chasm shape was informed by a funnel, collecting and recording the phenomena and program, integrating the dynamic of flight into the building. The chasm allowed a momentary differentiation of space, a narrow temporal zone in which a graduation of intensity was created, that descended down the levels from observation to arrivals. This graduation was achieved via manipulation of light and material. The shift from translucency to transparency was informed by the images produced by baggage X-ray machines. The aim of the design was to capture light as it is subject to differing materials and create a series of screens which inhabited the divide. This screening produced a three dimensional affect that was composed of temporal and ephemeral elements as images and silhouettes bounced back and forth from plane to plane reflecting, distorting and fragmenting. The chasm acknowledged the programmatic difference between local and international space. It was a fissure of recognition, defining a point of change which becomes a psychological boundary. The point at which tearful goodbyes and the anticipation of arrival is celebrated. A blurring of this boundary via translucency extends the experience of departure and satisfies a want of the waiting, as the traveller dissolves or appears through the screens.

### Light and Meaning

The principles of the manipulation of light and their shaping to inform programmatic concerns of architectural spaces is elevated to another level through the use of light as an expressive and emotive communication device. Light and its interaction with space, brings many inherent metaphors with it. Light has been a highly evocative phenomenon across all ages and cultures, its embodiment in art and architecture has served as a symbol of deity, purity, knowledge and pleasure.

The perception of light as a medium that carries deep meaning is still resonant within contemporary culture, despite the fact that we are assailed by 'radiant images or energy from screens, monitors, pages, and other sources that clutter our lives'.<sup>8</sup> Beyond the radiance of the advertiser's message light has the potential to communicate in many ways. It can be used to create intimate contemplative and spiritual places or to heighten the dramatic grandeur within the edifices of power and state. It can be used to evoke memories and commemorate loss. It can invoke feelings of the sublime through its boundless and awe inspiring qualities. Its affect can be moving and subtle or overwhelming in its impact.

In the 'Urban Void' project students considered the dynamics of selected iconic spaces within Melbourne's Central Business District and asked how light can be used in conjunction with sound to expose the context, history and issues of a particular site, and in doing so, evoke moods and emotions that create a new reading of the space. The confluence of light and sound is a particularly powerful tool for the designer to explore. While these two most

prominent yet separate sensorial stimuli seem to interact with and reinforce each other in many extraordinary ways it is a field that is only just being explored by artists and designers. In order to develop an intimate understanding of the conjunctive use of light and sound, the studio began with the production of a series of test rigs and experimental projects which combined the application of specific technical knowledge with an appreciation of tangible physical affects. In manipulating these phenomena and the specifics of their perception the project offered a refined comprehension of the dynamics at play within the intersection of the senses.

The design brief asked for the proposal of a spatial transformation that would take place within prominent urban interiors, from the hours of five and nine in the evening for one week, as part of the Melbourne Design Festival. This task introduced the concept of designing in time as well as space and addressed the temporal/ time based dimension inherent within the use of light and sound. The project highlighted a number of techniques and strategies that may be used in addressing a design that alters space minute by minute, hour by hour and day by day. The sites were carefully chosen to represent the civic values, historical periods, cultural institutions and corporate sensibilities that define Melbourne's character and architectural heritage. Collectively the sites and the students design interventions construct a portrait of the cities shared values, common beliefs and hidden desires. The projects encompass ideas on the construct of history, the nature of collective memory, the experience of duration and the resonance of the ephemeral and suggested how these may become key underpinnings for the development of an interior design. Ultimately the project uncovered how light and sound can be used to augment and amplify the conditions of an architectural space and in doing so expose layers of interpretation, contextual reference and potential metaphors inherent within the urban realm.

Through the studio a number of strategies for the use of light and sound in relation to urban space became apparent. In a number of projects that were sited in large corporate foyers and public atriums the concept of 'amplifying the everyday' became a strategy for the light and sound installation. In other projects students were challenged by the splendor of great buildings that seemed to hold deep histories and resonances within their interiors, in responding to these spaces the students often found narratives within the architecture from which to they could perform appropriate accompaniments to the existing order and beauty. Another typology of space that became apparent were 'spaces of memory', in which the students found, that through the nature of the program of the building, there was a compelling story that could be told through light and sound.

#### Future Light

In the twenty first century the role of the architectural, interior and product designer is to respond to ever rapid cultural and technological change and in doing so too suggest new ways of inhabiting and interacting with the spaces we occupy. The role of design education in this process is to promote new and original methods of thinking and produce graduates who are capable of anticipating the currents of progress and in doing so extend the boundaries of contemporary design practice. Such a sensibility empowers designers not only to embrace the use of the latest technology but also, through the speculative nature of design, formulate briefs and performance specifications for future technologies.

The approach to the teaching of the interaction of light within architectural spaces should seek to inspire students of design and their engagement with lighting technologies. In addressing, through education, the primary physical mechanisms employed in light's propagation and perception we can prepare design students with an immutable knowledge that can be applied to whatever sites, briefs and commissions they encounter in the future. The consideration of 'where does light move to' must be preceded by the question 'how is light perceived'.

Beyond the physical, perceptual and technical there also lies the interpretation of light as a medium that can be actively engaged in shaping the functional, spatial and expressive qualities of our urban environments. As the practices of architecture, art and design begin to merge through cross-disciplinary collaboration and as the technologies of light become discreet and programmable systems that can be orchestrated to transform the cityscape in miraculous ways, the preparation of design students for this practice, through the structuring of imaginative experimental pedagogy, that fosters a fascination for the potentials of light, is vital.

## Notes

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Phenomenology, Architecture and Light

Husserl Seminars, Department of Philosophy, The New School for Social Research

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