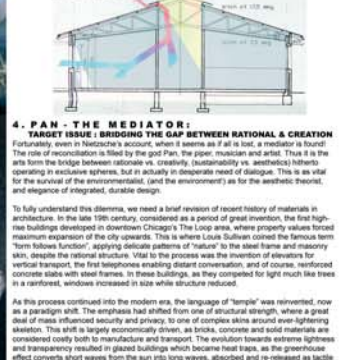
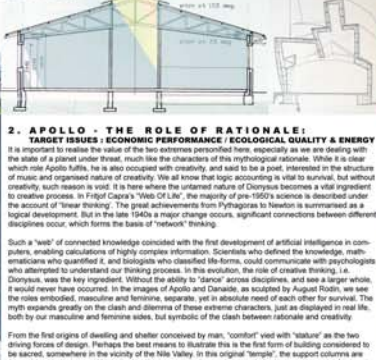


INTEGRATED SUSTAINABLE DESIGN: FORM VS. FUNCTION

1st HOLCIM FORUM FOR SUSTAINABLE CONSTRUCTION - SEPTEMBER 2004



1. INTRODUCTION:
FORM VERSUS FUNCTION:
 Currently, a great deal of attention is paid to sustainable architecture and all its technological as well as ecological implications. However, this rediscovered 'language' of environmental design, in visually alert with the aesthetic design of architecture. Although buildings are intrinsically measured in terms of environmental performance, the criteria for 'sustainability' are still being written. In most instances, photo-voltaic panels and solar water heaters are stuck on conventional form systems, inelegantly propped, climatically penetrating window skin systems.

At the other extreme is the formalistic approach to stylistic design, which trends such as post-modernism and deconstruction attempting to address the aesthetic experience of architecture. Frequently regarded as 'artistic', and hence sustainability, these aesthetic values dominate, such as the glazing of the Guggenheim in Bilbao, ignoring climatic and environmental responses in favor of dramatic effect.

The reference to basic needs as defined on the Hicson Foundation declaration, relates to quantum change, interpreted here as useful innovation, ecology, quality and energy in terms of passive climate design. But particularly explores the field of contextual analysis: a dramatic impact, related to projects from very low cost to more luxurious. All of the projects strive for maximum value from site and materials, and in this manner, the issues of ethical standards and economic performance are emphasized strongly in this document.

The mythological clash between Apollo and Dionysus, as leapers of our rational and emotive reason, aptly describes the dilemma faced by sustainable architecture. In this eternal state of tension, beyond the binary of formal environmental disaster is represented by the classic figure of Apollo. In the redemptive circles of 'green' architecture, the ultimate conscience about our role as consumers of the environment, perhaps benefits the role. In our account he represents the rational, conscious, deeply humanistic, and the other hand, represents the wild, unbridled, expressive and ecstatic, with of course, simultaneously all the creativity and danger which these qualities engender. Is there a place or a side for these extremes to co-exist, as they have in to our own minds, representing 'two sides of the brain'?

2. APOLLO - THE ROLE OF RATIONALE:
TARGET ISSUES: ECONOMIC PERFORMANCE, ECOLOGICAL QUALITY & ENERGY
 It is important to realize the value of the less extensive personalized form, especially as we are dealing with the state of a planet under threat, much like the character of this mythological hero. While it is clear which role Apollo fulfills, he is also coupled with creativity and his role as a poet, interested in the structure of music and organized nature of creativity. We all know that logic accompanying a vital to survival, but without creativity, such reason is void. It is here where the untamed nature of Dionysus becomes a vital ingredient to creative process. In Fritz Kraus's 'Vital Ecology', the majority of pre-1950s science is described under the account of 'linear thinking'. The great achievements from Pythagoras to Newton is summarized as a logical progression. But in the late 1940s a major change occurs, significant connections between different disciplines occur, which forms the basis of 'network' thinking.

Such a 'web' of connected knowledge coincided with the first development of artificial intelligence in computers, enabling calculation of highly complex information. Scientists who defined the knowledge, mathematicians who quantified it, and biologists who classified life-forms, could communicate with psychologists who attempted to understand our thinking process. In this evolution, the role of creative thinking, is a Dionysus, was the key ingredient. Without the ability to 'dance' across disciplines, and use a larger world, it would never have occurred. In the images of Apollo and Dionysus, as sculpted by August Rodin, we see the roles embodied, masculine and feminine, separate, yet in absolute need of each other for survival. The myth expands greatly on the clash and dilemma of these extreme characters, just as displayed in real life, both by our masculine and feminine sides, but symbols of the clash between rationale and creativity.

From the first origins of dwelling and shelter conceived by man, 'contour' void with 'nature' as the two driving forces of design. Perhaps the best means to illustrate this is the first form of building considered to be sacred, somewhere in the vicinity of the Nile valley, in the original 'temple', the support columns are symbolic both of structural integrity and link between heaven and earth. Likewise the pitched roof is terminated by a pediment on the gable ends, symbolizing the structural notion of issues spanning over columns, with the triangle pointing to heaven as a place beyond man. In this simple example, an argument which has persisted through Greek Classical, Vitruvian, the Middle Ages, Renaissance and Modern Movement comes to light, the elements of form vs. function. Much wisdom has been expounded around this issue of functional design (purpose) and form (aesthetic). Many refined masters of philosophy, throughout different ages, came to the conclusion that the ultimate expression of this relation was reached when form and function became one entity.

The humble example of a day-care clinic in Alexandria, a township in North-East Johannesburg, with a history and site as the city, as shown in the artist's attempt at integrated design. It is best as the rational and health-care nurses were asked to comment on the illustrated model, top left. The site was located towards future expansion, on a previously forgotten urban dump, so pile foundations were an added, unforeseen cost. Local healthcare required durable walls of face-brick, considered both desirable and permanent for local community, and large shaded North-south, so pile foundations were an added, unforeseen cost. Local healthcare required durable walls of face-brick, considered both desirable and permanent for local community, and large shaded North-south, so pile foundations were an added, unforeseen cost. Local healthcare required durable walls of face-brick, considered both desirable and permanent for local community, and large shaded North-south, so pile foundations were an added, unforeseen cost.

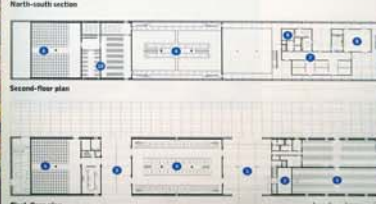
The maximum efficiency of 12.5m width modules were linked by a central entrance, but offset to avoid sitting directly with different colored rainwater downpipes expressing the two separate functions. A solutions allowed for ceilings to slope upwards, encouraging stack effect and avoiding 'booster' spaces in the lower level. The exposed portions of steel structure are intentionally colored to blend with the building's facade, with the best roof insulation affordable within budget. In an area where crime and politics made securing with a best roof insulation affordable within budget, it was completed in less than 6 months, slightly below a humble budget, and considered successful in terms of related treatment and health reduction, particularly in terms of Aids awareness.



3. DIONYSUS - THE AESTHETIC ARGUMENT:
TARGET ISSUES: CONTEXTUAL RESPONSE & AESTHETIC IMPACT
 In the plethora of various modes of 'beauty', one of the critical role modes must be that of nature itself. A fine appreciation of historic definitions of beauty comes from Susannah Hagan's 'Taking Shape'. Firstly there is the Vitruvian triangle of firmness, commodity & verities, expanding the form & function with beauty as integral part, but always of subtle historical beauty is a symbol of power. Secondly for Aristotle, the beautiful object is the one which has the ideal structure. It has the form of a totality, clear and distinct, any addition or subtraction from the object would run its form' (Cousins, 1964: 81). Albert's definition echoes this idea of harmony, proportion and completeness, while further linking beauty to diversity, diversity to both, and hence beauty to its self' (Spiegel, 1991: 13). It is used to describe modernity, 'an understanding of nature in all her guises, from violent storms to expressive tragedy, changed the fractal definition of beauty, such as the artist Turner's bent to light's marks or train windows before painting. Despite this enlightened realization there are always subtle critics of such new form, 'the architecture of deconstruction, of fading, of non-linearity are three of its embodiments, and are found ugly, that is, out of place' (Cousins, 1964: 81). A fascinating view of beauty is articulated by Peter Eisenman which locates both old and new definitions. The Vitruvian tradition has always put itself in a... condition of necessity, but it is not something displaced... beauty itself surrenders space and excess. (Eisenman, 1993: 131).

It is at this stage though, that the awkwardness of 'out of context' should be pointed out, however precious these icons may be to some. In it early works by Frank Gehry, simple vernacular shade rock lined in two dimensions, or a related signage on translucent metal mesh allowed identity and airflow. (from follows function). Yet in later 'philosophical' stages, nature is frequently used as an image, but purely superficially. Note the use of scales as cladding to white fish or scales, which take little or no cognizance of the water or airflow actually afforded by nature's ingenious design. This is clear at the Bilbao museum, where aircraft design software was used to calculate 'Titanic' cladding panels, yet in evidence of the structural evolution or scale-related interior demonstrates the extravagance. Although it is a favoured in the world of fashion, applying the image of Bilbao, it uses fossil fuels unconsciously for lighting and air-conditioning, while exploiting elegant modes of nature but less than its own.

More recently the term 'form' that is simply for its own sake and thus representing the essence of its self' (Spiegel, 1991: 13). It is used to describe modernity, 'an understanding of nature in all her guises, from violent storms to expressive tragedy, changed the fractal definition of beauty, such as the artist Turner's bent to light's marks or train windows before painting. Despite this enlightened realization there are always subtle critics of such new form, 'the architecture of deconstruction, of fading, of non-linearity are three of its embodiments, and are found ugly, that is, out of place' (Cousins, 1964: 81). A fascinating view of beauty is articulated by Peter Eisenman which locates both old and new definitions. The Vitruvian tradition has always put itself in a... condition of necessity, but it is not something displaced... beauty itself surrenders space and excess. (Eisenman, 1993: 131).



5. DOMINUS WINERY, CALIFORNIA:
QUALITY CHANGE & INNOVATION
 In the 1970s the artist Joseph Beuys wanted to build a new winery in the Napa valley, he requested a Christian and the Chinese Mouson wanted to build a new winery in the Napa valley, he requested a proposal by the renowned architects of the Louvre pyramid, I.M. Pei & Partners. Their scheme was highly stylized, and seemed to require a huge budget on the vineyard land. Since Chaves had worked as an art curator in Paris, an alternative proposal submitted by Swiss architects Herzog & de Meuron was received, occupying a significantly smaller, but highly optimized form. Those who had been told at the point where the slope changes from the most valuable footholds to the near level terrain at roadside. The restrained stone rectangle also straddles across two access paths into the property, and parallels the direction of the hills behind. Referring to an ancient outlier of domestic construction in the warm climate, loose packed stone was the preferred choice of material, after erasing the site stone samples on site.

6. DOMINUS WINERY, ENVIRONMENTAL DESIGN:
ECOLOGICAL QUALITY AND ENERGY
 Climatic control is generally defined by four measurable climatic aspects, (also evident in this project):
 1. Temperature
 2. Solar Air Temperature
 3. Air flow
 4. Humidity
 Of course additional factors such as human activity, clothing and weather patterns at large, influence this comfort range. The use of socio-economic employment systems, and appropriate maintenance, completes the thoughtful three aspect environmental design. Dominus project, these means to deal with address with a great sense of ease, but extended to an understated, yet highly advanced aesthetic design. Internally, fit up concrete walls facilitated rapid construction, but local workers were employed on site to pack the stones in their respective cages, emphasizing the role of socio-economic participation. The gradation of size in the stone walls allow a visual distinction as more light penetrates towards the top, while the smallest cages at the base, make it difficult for dangerous raftermates to nest among warm stones. Thus, without harming local fauna, there is a gentle understanding of nature and landscape, extending the stone-based layer above employees insulation on the roof. Functions of the minimal stone building, the so-called 'loose packing' concept, is designed by the smaller roadway cutting through the apparently solid stone masonry. The layout of the cellar is compressed by the higher floor process, a simple clear and precise tool for minimum intervention in the process from the full of a vintage to the subtle sense stone in small oak 'barriques' or vats, at the end of the process. It is in the open formation walls, as well as circulation routes and pavise areas, where the cooled effect of airflow through the open stone walls, are most significantly felt.



The most innovative decision, however, is the use of wine cages. Known to designers from mountain gorges, as road retaining structures. Here, the stone from a nearby quarry is packed in gables which match the size of stone, smallest at the base, medium above, and largest on top. Clearly, the airflow increases through the largest openings on top, aiding stack effect by heating from upwards, but further, the mass insulation afforded by storing strong daylight energy is transferred upwards at night, creating an even diurnal temperature range. Hence, greatly reducing the cooling load required in wintering procedures. Further, a limited amount of light enters through the stone, in keeping with the cooling technique required, but simultaneously creating beneficial effects of light on translucent non-stone or on ancient pottery.

It is significant that Herzog and de Meuron participated in a major art event in their home town of Basel, with the artist Joseph Beuys, exploring the qualities of materials such as local stone. Thus, clearly, their knowledge of the arts related to architectural theory, informed a remarkably appropriate and innovative series of choices.

7. DOMINUS, THEORETICAL APPROACH:
CONTEXT & AESTHETIC RESPONSE
 The landscape and site variables described above are not accidental. The use of local stone as a material, or a related signage on translucent metal mesh allowed identity and airflow. (from follows function). The evolution of stone to steel, crucial in the quality of wine production. Stone imbued bedded trees actually provide similar diurnal mass insulation to plants, keeping their roots cool by day and warm at night. This well known viticultural property of gravel soil is famous in the Southern French region of Chateau-la-Pudice. Clearly, at Dominus stone walls symbolize traditional knowledge of magma, soil, landscape and micro-climate, known in French as 'terroir'.

As the unusual construction of a sophisticated French client, with a highly designed and informed, yet deeply concerned design practice, that results in this unique solution. The choice of a minimal aesthetic is carried through from outside to the interior, with the same wine mesh forming the balustrades to balconies overlooking the vineyards. Where a sealed environment is required, solid steel, or translucent white glass fit by cracks of light under the stone cladding. The material choice is concluded brilliantly in the wine emitting cellar, where vitally glazed doors are covered with mirror film, which reflects the vineyard, as they approach victory. Internally the deep blue green film-coated glass, which blocks solar radiation, ensuring the colour of wine bottles. A simple wooden table devoid of all ornament, where wine is prepared for tasting. Below the table behind a clear glass wall, inside, precious wooden vats are the only visible focus, simply lit by incandescent lights, appropriate for checking the colour of wine, and keeping with the minimal aesthetic of the design.

In comparison, a product applying material used for space heaters, in insulated chambers for solar production, is brilliantly used against a glazed curtain wall in Southern France. Here the use of the film results in a warm glow tone cast on the interior, again the result of an integration of functional and aesthetic choice.

Similarly, cruciform of rammer to and from the roof of the Minnaert Building in Utrecht, Netherlands, forms a heat-loss pond on warm nights, that dissipating an evaporative cooling system. Water pumped through 'vats' visible in the sealed concrete surface, further reducing mass insulation effect.

8. CONCLUSION: INTEGRATED SUSTAINABLE DESIGN
 It would be naive to argue for environmental architecture, only make the role of clay, brick and timber or earth and stone. It would be equally naive for the 'Design World' to ignore that we are part of nature, which we may eventually destroy, with ourselves, if we continue in ignorance. It may largely be due to Brenda & Robert Vale's seminal work, 'Shower Architecture', which quotes Herzog & de Meuron. They can do without architecture who have no ideas nor style in the color, that a rift developed between 'high architecture' and 'shower'. But we live in a complex, multi-faceted society, where technology is available to environmental needs, such as media, e-mail, internet and measuring devices. Susannah Hagan stresses the need for these avenues to recognize each other. The question then, is not whether the art of architecture carries any value within the parameters of environmentalism, but whether environmental architecture can afford not to value the art of architecture. (Hagan, 2001: 11)

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