The euclidian bias

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Abstract
This paper argues that the dominant design sensibility of the Industrial World and the bulk of the artifacts of the modern world are products of a distinct Euclidian aesthetic sensibility. This design sensibility differs significantly and is on many accounts contradictory to non-European aesthetic sensibilities. This paper analyses the key differences of these sensibilities that are generally ignored in the current discourse on design which often assume the universality of design principles.

It is argued that Euclidean influence resulted in the geometricization of European Aesthetics giving it a very distinct bias with significant implications in art, architecture, sculpture and products, spanning from the Greco-Roman period to the present. Extracts are presented from design, literary and scientific works to substantiate this. The deep integration of Euclidean values into European culture is pointed out, using examples taken from the English language where virtue is attached to Euclidean geometric forms in away that is unique to European languages.

Non-Euclidean geometries, mainly fractal geometry that is sympathetic to natural forms, are briefly discussed. It is pointed out that, as all objects are inherently geometric, aesthetic systems that venerated nature have developed sophisticated systems of understanding and applying non-Euclidian geometry. Examples from Chinese paintings of Rock formations are presented to illustrate this.

It is argued that geometrizing aesthetics in its narrow Euclidian interpretation gave European cultural artifacts clear distinction and set it apart from nature which was seen as chaotic and lacking in order. Examples are presented from European and Chinese garden design where these differences can be seen in stark contrast.

This paper's objective is to throw open an urgent challenge across the design discipline with the basic contention that the rationality of Design Aesthetics is valid only within the constraints of particular cultures and that the assumption of universal values in Design is greatly flawed.

In this context it becomes important to understand and appreciate the diversity of values and philosophies that generate these differences. By doing so we may better understand the Aesthetic outlook of other Non-European Cultures, and come to better understand - in sharp contrast - the distinctiveness of European Aesthetics.

European Aesthetics

While none would dispute the dominant role of Europe in shaping the material, aesthetic and political conditions of modernity, many scholars fail to appreciate its influence in shaping their own aesthetic and philosophical outlook. As a result, the current discourse on Aesthetics in Design is constrained by a limited if not a Euro-centric view and most often flawed by its assumption of universality.
While it is important to recognize that the European Aesthetic Sensibility is a fusion of many Aesthetic and Philosophical strands, the Euclidian Influence appears to be historically the most dominant, influential in defining the European Scientific, Philosophical and Aesthetic framework. Its influence is so powerful and so permeating that it is rarely seen as an influence, but more as an essential building block of human rationality and of science embodying unquestionable truths that form the very basis of human civilization.

European philosophers have sought to understand and interpret the world and the universe in terms of their own understanding, which is heavily Euclidean. They equate a particular form of reasoning to rationality and its particular mode of thinking as truth. In the sphere of Aesthetics it associates Euclidean Geometric forms to truths, and other Geometric forms (such arbitrary curves) to untruths. Such thinking is deeply embedded in the European psyche and is even embedded in its languages.

Examples from the English language:

“it is not straight”; “he is crooked” – not straight; “warped logic; “It does not square”; “twisted reasoning”.

Deviation from simple Euclidian geometric forms carries negative connotations in a way that it particular to European languages.

Its effect on European art is not different finding its ultimate expression in Cubism .

“Today, although we claim to be free of the bounds of perspective, we hold slavishly to a notion of a box view of a whole. It is as though Cubism has planted an ink-lined box in our brain which we immediately superimpose over any image that provokes an aesthetic response”.

Euclidean Aesthetics

Euclid, best known as the author of “Elements”, lived during the reign of Ptolemy (306-283 BC) in Alexandria where he established a school of Mathematics.

“The name Euclid is often considered synonymous with geometry. His Elements is one of the most important and influential works in the history of mathematics, having served as the basis, if not actual text, for most geometrical teaching in the West for the past 200 years. It contributed greatly to the “geometrization” of mathematics and set standards of rigor and logical structure for mathematical works.”

Not only did Euclid’s influence geometricize mathematics, it is argued in this paper that it geometricized European Aesthetic values in a powerful and distinct way. And through this, given the dominance of Europe in the past few centuries, the world we live in has been shaped by this narrow interpretation of order.

Euclidean Aesthetics is defined here as a set of values that uses Euclidean Geometry in defining Beauty. It associates Aesthetic Value to a particular form of Geometry. So strong is this association that it equates Beauty to particular kind of Geometry. As all objects possess some kind of geometry, only a discriminatory geometric system could clearly assign positive and negative aesthetic values. Euclidean Geometry did exactly this. It assigned positive values to Euclidean geometry that is never seen in nature: squares, circles, triangles and polygons. This geometry was seen as magical: beyond the flaws of nature, unique to humans, and the fruit of their rational mathematical imagination. Everything that was built on Euclidean geometry stood out from nature. It gave special meaning to things ‘manmade’, and to Euclidean eyes superior to what is to be found in the natural world. It
celebrated this distinctiveness. It placed a human value system above nature in a distinct and defining, and ultimately dominating way, contrary to the values cherished in Asia and Africa where the primacy of nature was never questioned, and doing so would have been sacrilege of the highest order.

As stated by Galileo, the master of counter intuitive abstraction, in 1623:

> Philosophy is written in this grand book - I mean the Universe - which stands continuously open to our gaze, but it cannot be understood unless one first learns to comprehend the language in which it is written. It is written in the language of mathematics, and its characters are triangles, circles and other geometric figures, without which it is humanly impossible to understand a single word of it; without these, one is wandering about in a dark labyrinth.³

Such thinking was seen to modern scientific reasoning based on rationality. For the next 350 years the scientific world was bound by this spell of rationality. In 1984 Benoît Mandelbrot broke this long spell and developed the notion of a fractal geometry that opened up a new way of looking at the natural world.

### Non-Euclidean Aesthetics

Why is geometry often described as cold and dry? One reason lies in its inability to describe the shape of a cloud, a mountain, a coastline, or a tree. Clouds are not spheres, mountains are not cones, coastlines are not circles, and bark is not smooth, nor does lightning travel in a straight line ... ... Nature exhibits not simply a higher degree but an altogether different level of complexity. The number of distinct scales of length of patterns is for all purposes infinite.

The existence of these patterns challenges us to study those forms that Euclid leaves aside as being formless, to investigate the morphology of the amorphous. Mathematicians have disdained this challenge, however, and have increasingly chosen to flee from nature by devising theories unrelated to anything we can see or feel.

“Nature Does not pre-determine. She does not use Mathematics; she does not deliberately produce patterns; she lets whole patterns produce themselves. Nature does what nature demands; she is beyond blame and responsibility.”⁶

Chinese painters have long understood and appreciated this phenomenon. They attempted in their drawings to capture the essence of natural form and replicate it on their own way instead of copying nature in its physical detail. This process of intellectually and aesthetically internalizing the forces and forms of nature had deep significance in Zen Philosophy.
Within the European Aesthetic framework the entire sector that deals with nature is classified as “Rustic,” which constitutes only a minor strand of the European Aesthetic Spectrum. In contrast, the entirety of Chinese and East Asian Aesthetic development has occurred primarily within this sector, reaching high levels of advancement and refinement.

Contradictory Aesthetic Frameworks

Most Non-European civilizations developed various systems of aesthetic values that are distinctively Non-Euclidean, and in many cases, especially in Asia, hold core values that are indeed contrary to Euclidean Aesthetic Values. There two reasons for this. Firstly, they did not share the Euclidean conception of the world; and secondly, their belief in the primacy of nature – which is created mostly out of non-Euclidean geometry – rendered Euclidian forms unnatural and contradictory to nature. These traditions espoused instead, the simple and the complex geometric forms of nature as sources of value and inspiration.

“Until lately, people found nature most beautiful when it was tamed, arranged, and dressed up in an English or Italian art? or Japanese formal garden: flowers in groups and rows; the terrain flattened or landscaped in geometrical terraces; trees pruned to smooth green contours; rocks and wild grasses ordered or banished altogether. Such gardens must have given pleasure to the natural philosophers of earlier centuries, as they, too, struggled to order a messy universe. They revealed in the clockwork regularity that Galileo, Kepler, and Newton exposed in the night sky. They devised a calculus that made possible a coming era of mechanical and electrical engineering. They built a science well equipped for managing the orderly phenomena with which nature sometimes favors us. Like the formal garden, the edifice of classical science served as a haven against an untamed wildness.” 7
Aesthetics deals with that which is beautiful and universally appealing to the senses. [You can see the word buried in the term, ‘anaesthesia’]. Much of modern science builds a theory of aesthetics from the perfection of the circle, square, pyramid, and other euclidean forms...as we shall see, Nature don’t work that way...not in non-linear dynamics. This means that one cannot build a theory of elegant architecture, painting, poetry or music on symmetry, regularity, precision, uniformity or other neat and tidy terms so much beloved of modernists.\textsuperscript{8}

It is unfortunate that the philosophies that helped us to understand the motions of planets failed to see on earth the magnificence of nature.

Conclusion

It is unnecessary to argue that most of the manmade products that we see and use today have been shaped by an Euclidean Ideology. Europe harbored the birth of the Industrial Revolution and built into it a cultural bias. Most Aesthetic movements including the Cubist, the Bauhaus, the Postmodernist, were built on firm Euclidean foundations. Though the modern movement in architecture created what is called the “international style,” it is essentially a European style. One of the founding fathers of the modern movement Le Corbusier, who even wrote “a poem of the rectangle”.

This paper points out that this passion for Euclidean Geometry is not shared by other Aesthetic Frameworks, which in many ways are aligned in an opposing direction, pointing the axis of perfection towards natural and un-Euclidean forms. These are present contradictions that are difficult and perhaps impossible to resolve. Hence, so far, the bulk of those in the non-western world have also chosen to adopt the Euclidian Aesthetic as an integral part of modernization.

“If art is looked at as a species specific behavior that has evolved for adaptive purposes, a new aesthetic is needed. A new aesthetic is needed, anyway, because the old aesthetic has fundamental problems in logic, in being exclusive (not all art is included) and, because of its exclusiveness, its ties to artistic traditions of the West. Other contemporary opponents of the old aesthetics (postmodern deconstructionists), because they offer only a reaction to the old aesthetics, also are rebutted.\textsuperscript{9}”
While globalization so far has overlaid a strong European Aesthetic bias on the rest of the world, the process of globalization itself is creating new and powerful centers of power, wealth and culture that are poised to ‘re-orient’ the Aesthetic outlooks of the future. Historically, these new centers also have well-developed senses of Aesthetics that are quite different and sometimes contradictory to the values that are in global dominance today. Some of these sensibilities may in fact be more aligned to the environmental concerns and be more suitable for life in a planet that is paying a heavy price for the negligence of nature.

It will be interesting to speculate on the Aesthetic frame work or frame works of the future. As the process of globalization is irreversibly connecting the many disconnected peoples of the world, it is bringing together billions of eyes that are not beholden to the Euclidean view yet live in a Euclidean world.

Notes
3 There is also non-Euclidean Geometry.
4 The Beauty of Fractals, H-O. Peitgen P.H. Richter Springer-Verlag
5 homer.hcrhs.k12.nj.us/esoup/ esvol16/tsunami/ (copy right free)
6 http://www.drf.nl/kunst/fractals/fractals.htm (copy right free)
9 SOCGRAD MINI-LECTURES by T. R. Young
   The Red Feather Institute http://www.tryoung.com/lectures/025PostmodernPhenomenology.htm