

From the Origin of Drawing to Cinemetrics

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ABSTRACT

Robin Evans in his article “Translations from Drawing to Building” explores the gap and transitive properties between architectural drawing and building (1997, p186–187). He concludes with some questions arising from the allegorical painting by Giacinto Brandi depicting a portrait of a courtesan holding a divider. In contrast to the architect/geometer in William Blake's painting “Ancient of Days” which from the architect's point of view relates more to conventional measurement, precision, perfection, and also projection, the Giacinto painting may tell a story of architecture's mediation and negotiation in-between drawing and building under the prejudice or shelter of these big conventions upheld by a God-like character. The divider is a beginning instrument for me, as a designer not as a historian, to explore new ways of design

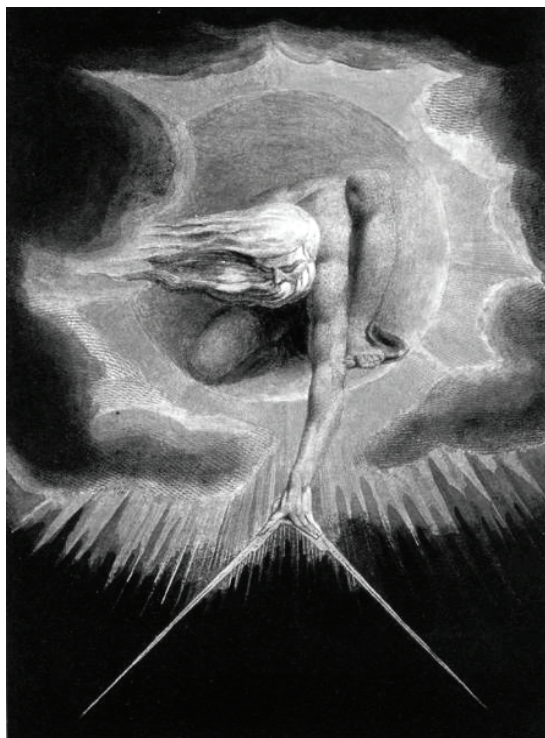


Figure 1:
William Blake, *The Ancient of Days*, 1794. Urizen, represents conventional reason and logic, creating the universe.



Figure 2:
Giacinto Brandi, *The Architect*, c.1650.

thinking by measuring, scaling, and navigating between representational systems. To free architecture from the prison of the current fixed forms of representation, Brian McGrath and Jean Gardner introduced the new 'Cinemetrics' drawing system that embodies relational thinking and engages architects with space, movement, and social interaction in the making of new architecture (2007). This paper demonstrates the results of testing Cinemetrics as a post-perspectival, cinematically inspired drawing system in several international workshops. Cinemetrics relational and contextual thinking with open-ended feedback loops is analyzed in relation to Chinese culture and philosophy, which has been 'lost' completely in the teaching of modern architecture. This essay concludes with the notion that a discussion of Asian modernity should be grounded in the way we draw, by bringing forward aspects of Chinese cultural myths on the origin of drawing as a means of understanding architectural representation, bridging the gap between drawing and the real world, Chinese tradition and modern representational systems.

THE BLIND SPOT OF ARCHITECTURAL REPRESENTATION

Modern systems of architectural representation developed over hundreds of years and is based on drawing from points and lines to orthographic projection such as plans and elevations, and other more complex projections like perspective or axonometric. Albrecht Dürer's machine noting the intersection of drawing plane and a string of projection from the outline of a lute to a fixed point on the wall, and Brunelleschi's tracing of the reflection of Florentine Baptistery on a mirror, contributed during the Renaissance to the development of mechanical drawing of perspective as a scientific medium between our mind and the real world. William R. Ware, the founder of the school of architecture both at MIT and Columbia University, taught students the skills to make perspective drawings in the early 20th century. In the book "Modern Perspective: A Treatise Upon the Principles and Practice of Plane and Cylindrical Perspective" (1882), Ware wrote that architects need to use perspective to eliminate and filter out the perplexities and disordered situations in nature. Architectural representation, employing perspective drawing that geometrically connects the virtual, single-eyed, and privileged viewpoint to the real world, inevitably creates at least six blind spots to the right, left, top, below, and back of the observer, and behind the drawn object. It follows the restricted and limited framework adopted by the Ecole des Beaux-Arts, and keeps a closed and isolated relationship between a site and drawings within a fixed medium, to create the architect's utopia disconnected from reality.

In the book "Projective Cast: Architecture and its Three Geometries" (1995), Robin Evans concludes with a description of three geometric relationships that form the network of perception and architectural

design thinking. This network of architectural representations embodies the projective nature of drawing. He uses a triangular diagram in which ten transitive/projective spaces are generated between the 'observer', 'orthographic projection', 'perspective projection' on three vertices, and the 'designed object' in the center. Modern drawing technique has become an isolated system. It is not only on the opposite side of construction, but also constitutes an abstract field disengaging itself from the surrounding world in which city and architecture have become the mega-network of dynamics filled with movements, events, and activities. Focused on the conventional structure of static and de-contextualized objects, the representational system is a "self-correcting means of stabilization and pacification of the physical, built environment" (Shane, 1995, p.68), and inadequate to transform reality and correspond to a new paradigm shift: the technological development of the internet, computer, and digital communication; flow and



Figure 3:
Albrecht Dürer, *Perspective Machine*, 1527. The fixed end of the string as virtual single-eyed viewpoint, the machine can be operated without seeing the object, or by a blind person.

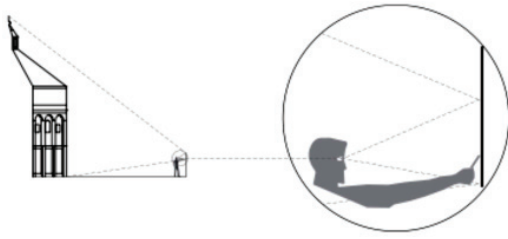


Figure 4:
Brunelleschi turned his back to the building that he drew. Redrawn from Dubery, Fred and John Willats, "Perspective and other drawing systems", Van Nostrand Reinhold Company, 1972, by Brian McGrath, "Cinematics: Architectural Drawing Today", John Wiley & Sons (London), 2007.

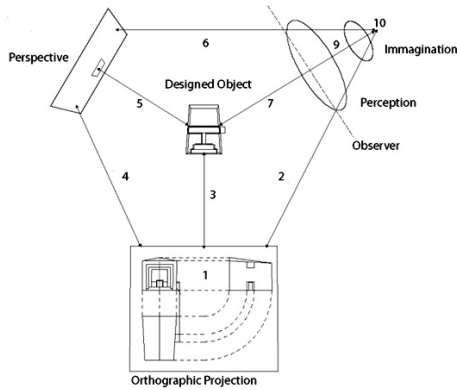


Figure 5:
Robin Evans, *Projection and its analogue: The Arrested Image with ten transitive spaces*, Projective Cast, 1995.

exchange of capital and commodities within global capitalism and consumerism; sharing and clouding of knowledge and information; social engagement and interaction, etc.

THE ORIGIN OF DRAWING

Exploring myths on the origin of drawing in Chinese culture can provide another critical view of the projective nature of architectural representational system and Western modernity itself.

According to the ancient tale, Fu-Xi one day saw a monster 'dragon-horse' coming out of the river, with a dotted pattern on its back. Capturing those dots, Fu-Xi created a drawing named 'River Drawing' that eventually evolved into 'Ba-qu', and other formats of drawings and writings. Ba-qu are eight diagrams to represent eight principles or eight interrelated concepts of the universe including sky; earth; thunder; wind; water; fire; mountain; and lake. In the

book "The History and Chronology of Paintings" by Yen-Yuan Chang (Tung Dynasty, 850 A.D.) "... after Fu-Xi discovered inside the Zong River, books and drawing was invented..."; Shi-Tzu commentaries for I-Ching (commentaries for the 'book of changes' c.400 B.C.) Also mentioned in the first chapter "In the ancient time when Fu-Xi ruled the world, looking up he contemplated the stars and phenomena in the sky, and looking down he surveyed the laws on the ground. He observed the skin patterns of animals and different types of the soil, as close as from his own body, or as far as from things in general. Based on this he devised the Ba-qu (eight trigrams), to represent and understand the intelligence of god and universe, and to classify the senses of all the myriads of things."



Figure 6:
Fu-Xi and Nü-Wa, Tung Dynasty, 600-900 AD.



Figure 7:
Fu-Xi and Nü-Wa, Han Dynasty, 200 BC.-200 AD.



Figure 8:
Cheng Dawei, *Dragon Horse Bearing the Drawing, Case of Algorithm*, 1592.

Fu-Xi and his wife Nü-Wa are a famous god and goddess in ancient Chinese myth. Recent archeological finding links them to the Dadiwan civilization (5800-5400 BC) from the Chinese New Stone Age. In the myth they possessed many powers. Fu-Xi invented drawings, and Ba-qu developed various tools for hunting and fishing, while Nü-Wa saved human beings from rains and flooding caused by the broken sky when Mount Buzhou that held the sky collapsed. By erecting four pillars cut from the legs of a giant turtle, and sealing the crack with smelting colored stones, she demonstrated construction techniques and cement-like materials

to build shelter for people. Looking at the ancient paintings, Fu-Xi is holding an 'angle', Nü-Wa is holding a compass or divider. They showcase the usage of drawing and engineering instruments in ancient Chinese culture. One invented drawing; the other invented building technique. Together they are the first architects in the world.

In "Translations from Drawing to Building", Robin Evans compares drawing practiced in Western art and architecture by studying two examples of 'Origins of Painting' (1997 p163-165): one is by David Allan (1773) and the other by Karl F. Schinkel (1830). Both paintings depict the act of tracing a shadow, cast by single point candlelight in Allan's painting, and by the sun in Schinkel's. Each responds to a



Figure 9:
David Allan, *The Origin of Painting*, 1773.



Figure 10:
Karl F. Schinkel, *The Origin of Painting*, 1830.

specific type of projection: perspective projection and orthographic projection. The natural, outdoor, and pre-architectural setting in Schinkel's painting suggests the drawing must come before building. The architectural drawing has power to generate new reality that is after and outside the drawing.

The story of 'River Drawing' has similar pre-architectural setting, but the origin of drawing is not through the act of tracing the parallel shadow. It was already on a half-dragon-half-horse monster. 'Dragon-horse' is recorded in a few poems and also in the book "Rites of Zhou", one of three ancient ritual books of Confucianism. In another ancient writing "Collection of the Mountains and Seas" (200 BC), "Horse is the actualized form of Dragon". The dragon and horse are transmutable in ancient Chinese myth. A horse is a living animal that can be seen, touched and ridden, with strong, steady, and lasting moving ability; while a dragon is hidden, invisible, and symbolic of sky/heaven, with dynamic, vibrating, and unpredictable sacred power. The drawing is not invented through projection, it pre-exists before any human act and needs to be mediated between horse and dragon, mundane and divinity, tangible and intangible. It is everything in-between the physical world and the concept behind it, and is materialized and named as drawing.

The 'River Drawing' depicts most importantly a square of dots. They contain mysterious numerological and astrological codes that combine the essence of traditional Chinese ideology: concepts of Yin-Yang, Wu-Xing (Five Phases), and Four Symbols. A taxonomy of astronomical events, seasons, orientations, and colors corresponding to the Chinese worldview are constructed by finding embedded relationship within these numbers of dots. For example, connecting the white dots and black dots separately form two clockwise spirals into a double helix structure, as represented in Tai-Chi (Taiji) symbol. The dynamic flows that alternate between movement and tranquility, create, contain, and become the source of each other, are reflected on the 'blank left' in Chinese painting that indicates incompleteness, void, and disappearance interchanging with eternity, solidity, and existence. The dots are a system situated between a bipolar physical and metaphysical world of 'dragon' and 'horse'. It is used as an instrument to understand the universe and to maneuver within it. Not focusing on the linear operation of projection, which is from one point of light source to the other point of fixed outline of shadow and to another point of pen or charcoal, the River Drawing is a diagram and media of dynamic flows and forces for the artist to draw, to manifest in respiration, and to find the embedded

relationship between the body and surrounding world. The depiction of projective shadow with linear, dark, and negative energy was abandoned in Chinese drawing history.

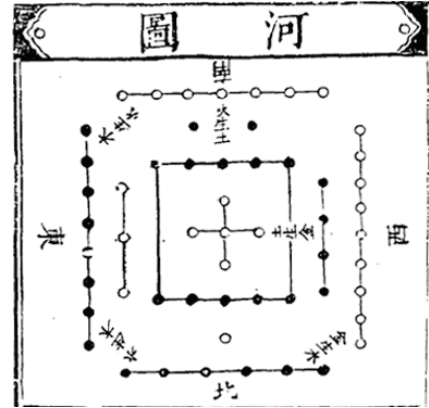


Figure 11:
Cheng Dawei, River Drawing, Case of Algorithm, 1592.

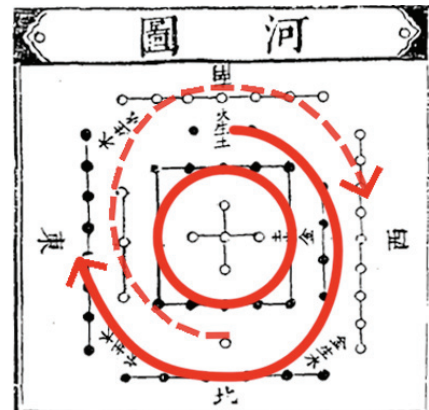


Figure 12:
Example of graphic/ numerological pattern.



Figure 13:
Symbol of Tai-Chi.

DRAWING THE UN-DRAWABLE

In the preface of the 590 AD book "The Record of the Classification of Old Painters", Hsieh Ho wrote down 'six principles of drawing':

1. To create movement and to reflect the vital breath, and resonance of Chi.
2. To seek the skeleton, the inner force of the brush, and the personality inside the brush stroke.
3. To draw in correspondence to the objects and depict objectively the shapes and forms.
4. To apply color in relation to different settings, sceneries, and objects.
5. To manage the placement of elements, the concept and the composition of the drawing.
6. To convey, transfer and imitate the spirit of previous drawing into new drawing.

Bogue was inspired by Maldiney's discussion of these principles: "two contrasting means of constructing space, the first via a global conception of an encompassing, ambient whole within which individual elements are already situated and structured (Large Form respiration-space), the second via a local operation whereby an individual element is connected to a neighboring element and then to another, and so on, as an open space of related but heterogeneous elements is constructed (Small Form skeleton-space)...", (2005, p.89). In his book "Cinema 1" (1984) Gilles Deleuze developed these two contrasting forms of space generated with the action-image: Large Form respiration-space and Small Form skeleton-space. "A metaphysical respiration- or skeleton-space renders visible both an action world and an idea immanent within it..." (Bogue, 2005, p.105). For Chinese artists or philosophers, it has been the same inspiration that nourished the development of painting since the 'River Drawing'. To draw is to animate the ink and water. In the sequence of moving the brush, the individual fragments are managed and constructed within whole composition of flows and Chi, and every brush stroke is interrelated. Shifted from linear thinking to relational thinking, visible things are not seen as isolated objects but as invisible relationships made sensible. It encourages us to draw the un-drawable by extending our sensory motors into new ways of seeing: chi, flows, forces, energies, conceptions, and time.



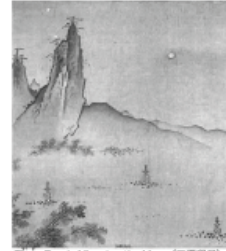
Dawn on the Su Causeway in Spring (蘇堤春曉)



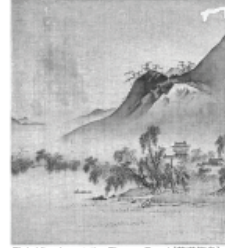
Leifeng Pagoda in the Sunset (雷峰夕照)



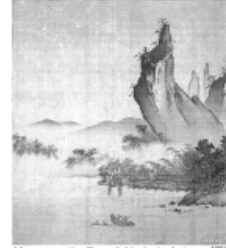
Orioles Singing in the Willows (柳浪聞鶯)



Three Ponds Mirroring the Moon (三潭印月)



Fish Viewing at the Flower Pond (花港觀魚)



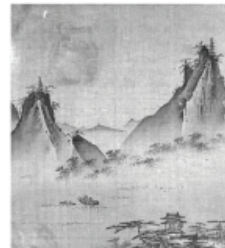
Moon over the Peaceful Lake in Autumn (平湖秋月)



Curved Yard and Lotus Pool in Summer (曲院風荷)



Evening Bell Ringing at the Nanjing Hill (南屏晚鐘)



Two Peaks Piercing the Clouds (雙峰插雲)



Remnant Snow on the Bridge in Winter (断桥残雪)

Figure 14:

Ye Xiao-Yan, *Ten Scenes at West Lake*, 1000 AD

Artist Ye, Xiao Yan (c.1000 AD) drew "Ten Scenes at West Lake" consisting of ten drawings: Dawn on the Su Causeway in Spring; Orioles Singing in the Willows; Fish Viewing at the Flower Pond; Curved Yard and Lotus Pool in Summer; Two Peaks Piercing the Clouds; Remnant Snow on the Bridge in Winter; Moon over the Peaceful Lake in Autumn; Three Ponds Mirroring the Moon; Leifeng Pagoda in the Sunset; and Dawn on the Su Causeway in Spring.

the Clouds; Leifeng Pagoda in the Sunset; Three-Ponds Tower Mirroring the Moon; Moon over the Peaceful Lake in Autumn; Evening Bell Ringing at the Nanping Hill; Remnant Snow on the Bridge in Winter. Brian McGrath uses the ten scenes as an example in writing about urban design futures in China: “The Ten Scenes form a vivid example of urban design as attentive circuit...” (2008, p.255s). The reality of West Lake needs to be experienced with the whole sensori-motor system through attentive recognition of specific moments over different times of seasons or a day, in different scales, distances, elevations, and viewpoints. Flowing through the drawings of ten scenes, images and memories of various journeys and repeated visits start to highlight, relate, and reflect in-between each drawing and memories. In comprehension of the impermanence of life, sentimentality of un-returnable youth, and in apparition and disappearance of volatile beauty, movements within single and across multiple drawings are reflected by changes respirating between large scale and subtle details. The non-specific order and open-ended arrangement of the ten drawings encourage multi-directional reading and re-reading of journeys in the mind to capture a deeper reality of West Lake.

It would be interesting to make a comparative analysis to what Sergi M. Eisenstein had drawn in “Montage and Architecture” (1989, p. 117-120). Eisenstein observes that film achieved what drawing cannot: the total representation of multi-dimensionality on two-dimensional surface, through intervals of particular spatial and visual impressions, which can also be experienced in architecture. He studied Auguste Choisy’s analysis of the Acropolis of Athens through sequential images of particular viewpoints. Spatial experiences that reverse, mirror, and inform each other produce architectural montage. Ten Scenes at West Lake has similar but more complex cinematic effect. By framing ten immobile cuts through matter-flux, the artist developed a drawing system with carefully framed intervals within the vibrational whole. At West Lake, unlike the immobile cut in film having still/frozen time, each interval actually embodies different and uneven time dimension in which the artist drew, captured, and vitalized the paintings. Other types of Chinese painting draws and views different relationships of the body, such as the ‘long roll’ style with a tilting- or panning-like operation as unrolled in one hand and rolled in the other hand. These techniques have different cinematic characteristics. Further study would be essential within the physical environment to see how it affects and generates a new reality, such as within the spaces of West Lake, and in other Chinese classical gardens today.

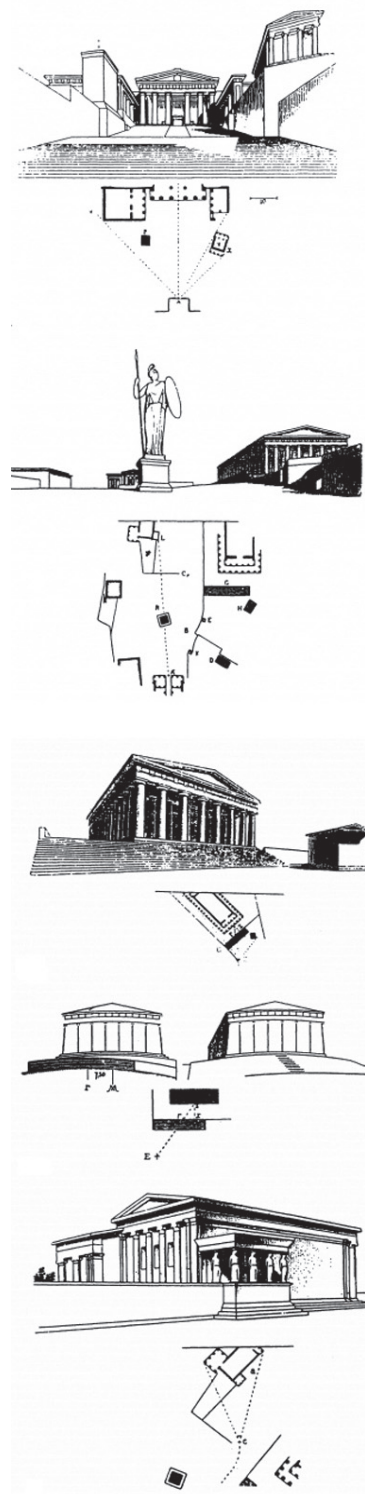


Figure 15:
Auguste Choisy, *Series of view when walking through the Acropolis*, *History of Architecture*, 1899.



Figure 16:
Sergi Eisenstein, *Analysis sketch of Choisy's Studies on the Acropolis, Montage and Architecture*, 1937.

THE CYBERNETIC ARCHITECT

Endowed with Chinese philosophy, the movements and flows of relationships in Chinese painting are analogous to what Deleuze derived from film to develop his philosophy. Saying this is not to start the comparative study on Deleuze's and Chinese philosophy, but to pay attention to the Cinematic drawing system based on Deleuze's theory on cinema, which utilizes an extensive sensori-motor schema to engage our new environment on various aspects. Rather than mechanical linear reproduction, McGrath and Gardner argue that a new relationship should be created between our body and the new environment following the digital paradigm shift that changes the way we process and employ information. By "framing immobile cuts through flowing matter-flux, generating space by shooting any-space-whatever, and building assemblages in the breaks within the modern sensori-motor schema" (McGrath and Gardner, 2007). They propose cybernetic architectural thinking shifting from part to whole, from object to relationship, from measuring to mapping, from content to pattern, from quantitative to qualitative, from linear to feedback loops, and from isolated objects to contextual relational fields.

Carefully investigating the architectural blind spots, disappearances and apparitions, and changing states of matter flux, a series of experiments have been conducted to test the new cinematics drawing tool in the campuses of National Chen Kung University and Chu Hai College in the city of Tainan, Taiwan and Hong Kong (McGrath et al., 2009). Being a cybernetic architect requires us to rethink architecture and city not as static and isolated objects but as dynamic and multiple-layered relationships embedded in matter flux. Interacting with what Deleuze classifies as movement images and time images, and applying cinematic methodologies of framing, capturing, and assembling images, the deeper understanding of reality and new perception can be generated and reflected constantly.

The following examples showcase three results of cybernetic architectural thinking using cinematic methodologies.

Example 1

A series of hand-drawings framed orthographically in close-up, medium, and long distance to capture movements in a public space, create affection, action, and perception images (Figure 17). Flows and activities in the space are drawn eliminating blind spots in multiple dimensional space-time considerations simultaneously. Drawings are in different scales with focuses on changes of spatial quality, speed, density, etc. Reading in linear one-directional sequence and in 90/180° rotational sequence generates new perceptions and spaces, with results similar to the discussion of Chinese traditional painting that reflects the movement of the Chi in the environment.

Example 2

Repeated shots staged orthographically at the same location create an attentive circuit and feed-back loops (Figure 18). Not only visual movements, but also qualitative changes of light, sound, density, and ethnic groups are deeper layer of reality in Hong Kong Central escalator area. Drawings as moving steps and sections of the escalator are both analytic and synthetic, and reflect the timeline, topography and ecologies of the site. This modern Asian city, fast paced and culturally multi-faceted cannot be experienced and perceived in fixed form of conventional representations. Human sensory motor systems are attended and extended to encourage new ways of sensing city as Chinese artists' animation of invisible and un-drawable relationships.

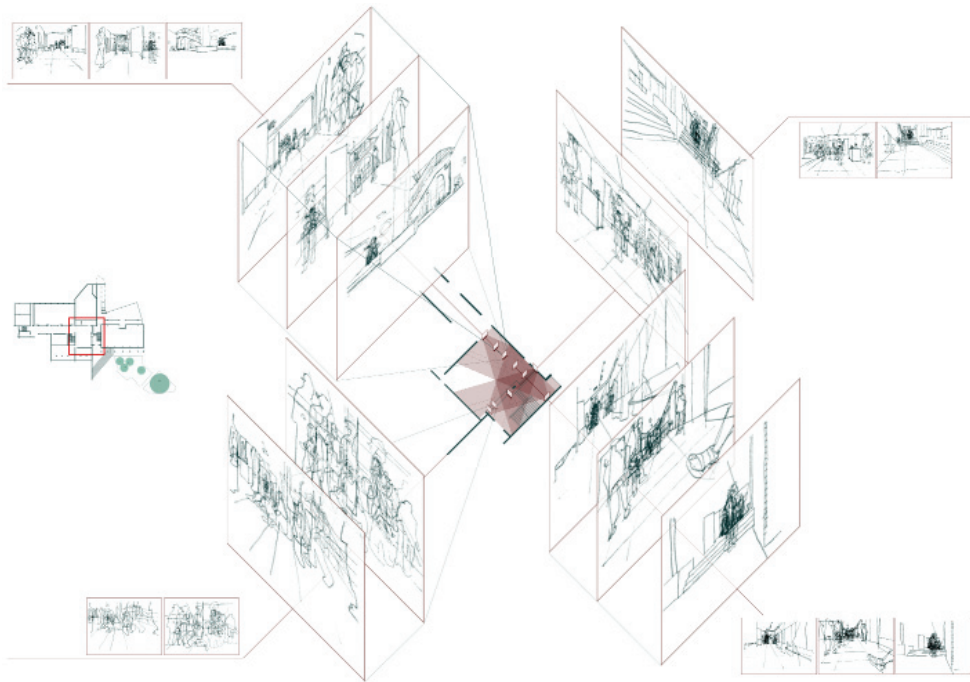


Figure 17:
Example 1: A series of hand-drawings.

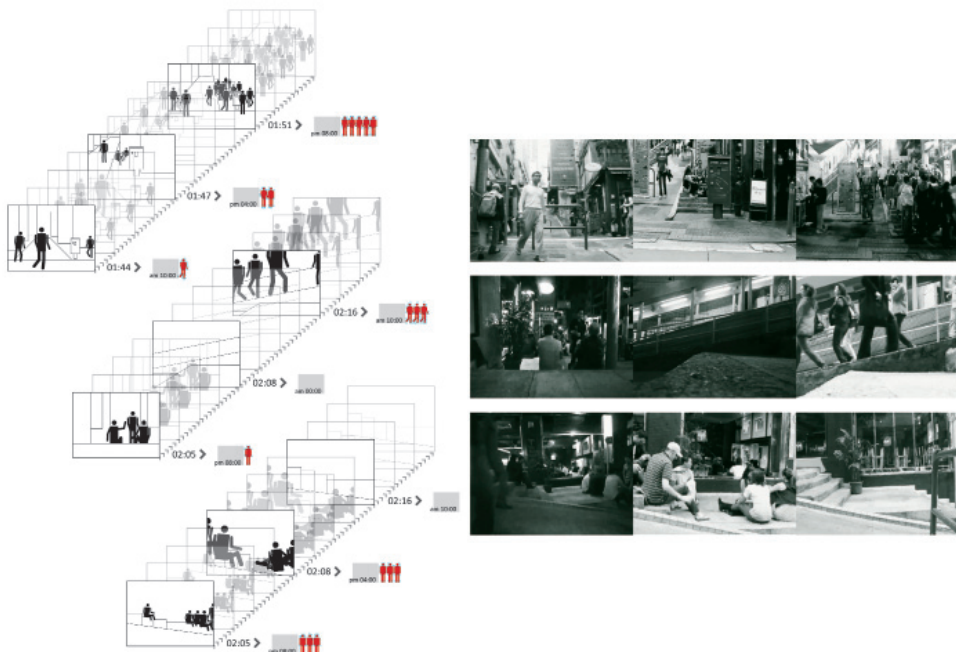


Figure 18:
Example 2: Drawings as moving steps and sections.

Example 3

Un-pragmatic view at close to floor height capturing movements of commuters' feet is intercut with stumbling feet of an elderly lady (Figure 19). Flashbacks of the elderly lady walking up from the escalator with people commuting to work reveals the history and relationship of the Hong Kong Central area and the role of the escalators at different times of the day. Down to work versus walking up to home; fast, neat, fashionable versus slow, difficult, and old; topographic, ethnic layout, social structure, and change of value in the area are reflected between drawings/ images capturing the essence of modernization at the expense of the old culture. Foot drawings are another kind of "ten-scenes of Hong Kong" that symbolize the fast speed apparitions and disappearances.

Cinematics provides us with new tools not only as a drawing system, but also in the engagement with our real life in the real environment with constant decoding and condensation of our senses shifting between various scales, and encourages us to participate in broader social and cultural interactions with open-ended, not only empirical thinking. Architectural design is developed from the changing states of matter flux from solid to liquid, and to gaseous perception, instead of designed objects projected from a static, ideal, privileged concept.

ALADDIN'S PALACE

In the TV movie "Arabian Nights", directed by Steve Barron (2000), Aladdin asks the Genie from the magic lamp for a palace so he can marry the

princess. Projecting back from layers of drawings on several looms the Genie is weaving, the palace is constructed directly on the orthographic manner. As an architect, I would like to have a Genie or such 3D printing machine that builds directly from plans, elevations, sections, projected from my mind. Realizing the origin of Chinese drawing, and Aladdin is Chinese in the tale; such projective magic that linearly transmits from point to point belongs to western culture. However, new concurrent conduits with flows reversed back from drawings to a new reality, Solomon's seal that bound the intangible power to the rubbing of an oil lamp, and textile-weaving as instrument of prosperity for Aladdin, also for ancient China, and industrial-revolutionized Europe, generate layers of perceptions in which the building is formed. The process to bring drawing into the real world is probably as almighty and mysterious as what resides inside the oil lamp and the bringing the world fire and light.

Aladdin's example presents a hybridization of the traditional Chinese concept of architecture projected into reality. It symbolizes the making of the building through the method of projective nature as Robin Evans' projection diagram. How can space be 'projectively' generated from drawing full of movement, flows of energy, and sensing experiences? In today's Asian cities this mixture does not seem to have any transplant rejection, actually it is the privileged system that prevails in architectural practice globally as a privileged pose in perspective. The reverse projection from orthographic drawing to Chinese building goes through many layers of machines that weave, thread, intersect, stagger, and transverse. It is this transmission, between drawing and new reality, that we need to focus on conveying our ideas and the way we draw in-between dots by Dürer and dots by Fu-Xi.

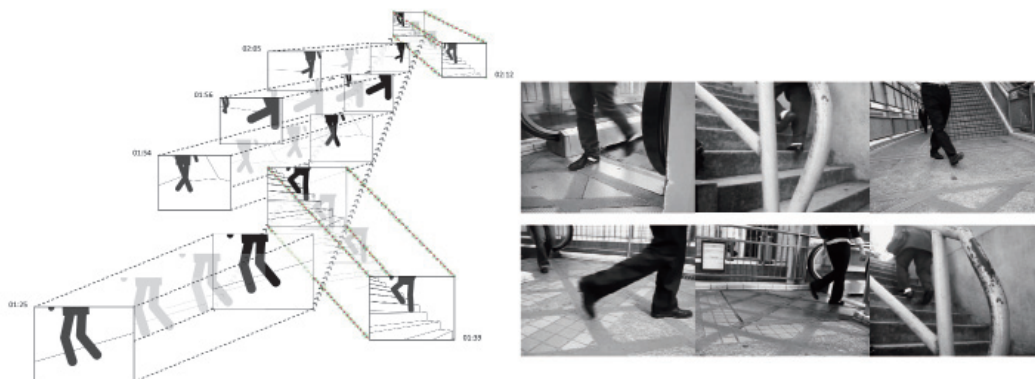


Figure 19:
Example 3: Un-pragmatic views.



Figure 20:
Scene of making the palace with series of looms, from the movie, *Arabian Nights*, 2000.

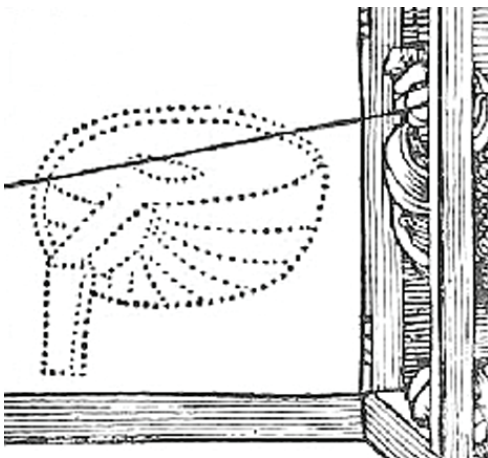


Figure 21:
Dot drawing from Dürer's perspective machine.

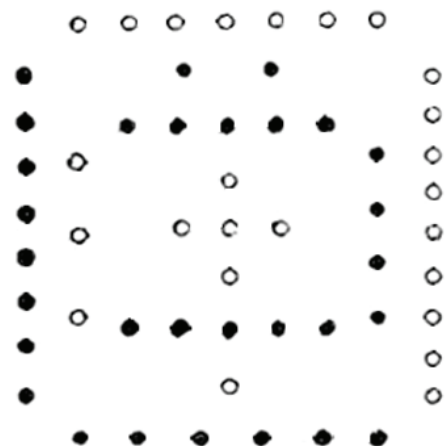


Figure 22:
Dot drawing from Fu-Xi's interpretation.

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