

Cognition and Visual Information:  
An Examination of Human Evolution, Cognitive Models and My Artistic Practice

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## I. Introduction

In my own practice I have come to see the different forms of cultural expression as ways of processing our social and physical environment. Throughout human evolution men and women have made objects, images and performed rituals that directly demonstrate the cognitive mode the society is functioning at. In my cross-disciplinary practice I am attempting to hold numerous cognitive, social and perceptual variables through encoding a visual language. The visualization of information is the lucid introspective relation between the resulting narrative and the visual language of signs and symbols. Consequently, this investigation is internally related with cognitive science, a field of inquiry that attempts to render a picture of how the brain processes sensory information. Also paralleling this cognitive investigation is a systems theory that attempts to visualize the fluidity of a non-discrete universe where social interactions correlate with the physical world.

A major element in my attempt to visualize information is the creation of a visual language by borrowing visual motifs, color, numeric and linguistic systems from numerous shamanistic, religious, mystical, scientific, linguistic and philosophical traditions. In developing these different languages I employ the meditative activity of repetition and concentration that is visually evident in my work. As Eastern meditation techniques are often associated with transcendence of mind and body, I am more interested in how repetition and concentration relate with cognitive abilities by which I can explore the relationship between visual information and the physical body. Thus, my project is concerned with the process of learning as I examine the relationship

between the physical and social data. This examination is organized by three referential modes: the iconic, indexical and symbol-symbol which can be associated with different phases in human cognitive evolution, as well as a move from the sensory to the purely abstract.

## II. Meditation and Science

My interest in exploring both Western and Asian traditions in the process of visualizing information comes from my experience and practice of Vipassana meditation. Vipassana meditation is rooted in the Theravada Buddhist tradition that places emphasis on a systematic examination of body sensations as a way of allowing deep issues embedded in the sub-conscious to come to the surface of the mind. One of my first Vipassana teachers was a recorded series, *The Science of Enlightenment*, done by the Buddhist monk, scholar, mathematician, and linguist Shinzen Young. In the series Shinzen takes what is a complete mystery to most of us of mind/body phenomenon and brings it to the light of scientific lucidity. Breaking down mental and physical phenomenon into quantifiable mathematical equations, Shinzen makes it evident that the sages could embrace the inductive investigation of the objective sciences.

In the fourteenth section of *The Science of Enlightenment*, Shinzen discusses the next mode in human awareness as a cross-fertilization of Eastern and Western philosophy and practice to create new paradigms for the future. As Shinzen states: “What we really need are individuals who understand both worlds really deeply... [And] willing to let go of preconceptions of both of those disciplines and look at something in a radically different way.”<sup>1</sup> Taking on this spirit in my life and work, I am deeply interested in what can be created by the cross-fertilization of meditation practices with the social and objective sciences.

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<sup>1</sup> *The Science of Enlightenment*, Young Disc 14

### III. Linguistic Foundation

In my cross-disciplinary practice of encoding a visual language it is important to understand how language operates. For understanding how I have come to use different systems in my work it is important to take into consideration the French linguist Ferdinand de Saussure (1857-1913). Ferdinand clarifies the mapping of symbols and the objects they represent in a *Course in General Linguistics* published in 1916, the beginning of structuralism. In his work on semiology, Ferdinand argues that word meanings can be modeled on two plains: signifiers (symbols) and the signified (objects they represent) [fig. 21].<sup>2</sup>

Yet this is not a sufficient model for understanding how words differ in the history of human evolution or animal communication. According to some cognitive ethnologist, animal calls, grunts, and gestures are similar to signifier/signified relationships. Research done in the 1980's by Robert Seyfarth, Dorothy Cheney and their colleagues found that velvet monkeys produced distinct calls to alarm their communities of different predators that allowed them to properly find a hiding place.<sup>3</sup>

American Philosopher Charles Peirce (1839-1914) has distinguished three types of referential associations: the iconic, indexical and symbol-symbol that aids in understanding semiology on an evolutionary level [fig. 22]. The iconic stage is where one finds similarities in time and space but is unable to make critical distinctions, such as the inability to distinguish the pattern of a gecko from the surface it is sitting on. This is a cognitive mode that is primarily associated with sensory phenomenon. The indexical

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<sup>2</sup> *Course in General Linguistics*, Saussure pp. 15-17, 65-70

<sup>3</sup> *Global Brain*, Bloom p. 55

stage is where one knows there is a causal relationship but is unable to symbolically represent the relationship, such as when one can slightly make out a distinction between the gecko and the surface it is on. This the transition mode from the purely sensory to the symbolic. The symbolic stage is where one is able to make a symbolic causal linkage between events. This is also the stage where symbols start to reference other symbols to form higher systems of ordered relationships, symbol-symbol. The three types of referential associations are in a hierarchical relationship where one first needs competence in the iconic before they can reach the indexical and then the symbolic.<sup>4</sup> As I am attempting to hold numerous cognitive, social and perceptual variables through encoding a visual language, I use Pierce's referential mode to organizes the visual information encoded in my work as I move from the sensory to the symbolic.

These different referential associations can also be associated with different parts of the brain and phases in human evolution. In relationship to brain physiology, the iconic mode is mapped to processes with single sensory modalities, such as the temporal lobe where visual and auditory sensory phenomenon are processed. This cognitive mode is evident with in shamanism. The indexical stage can be associated with the temporal lobe and parietal lobe.<sup>5</sup> This is the cognitive mode associated with religious activities. Cognitive scientists believe that the prefrontal cerebral cortex supports the creation of symbolic references that are crucial for human evolution, distinguishing us from other animals.<sup>6</sup> Thus, allowing humans to make higher-ordered sequential associations that

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<sup>4</sup> *Symbolic Species*, Deason pp. 69-100

<sup>5</sup> *Symbolic Species*, Deason pp. 289-90

<sup>6</sup> *Symbolic Species*, Deason p. 267

move us from indexical to symbol-symbol relationships. This is also the cognitive mode associated with philosophy and science<sup>7</sup>

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<sup>7</sup> *Symbolic Species*, Deason pp. 264-5

#### IV. Shamanism, the Iconic and Visual Information

Associated with the iconic mode, Shamanism is believed by anthropologist to be the earliest form of religious phenomenon and is found throughout the pre-literate world. It is still prevalent in isolated communities, such as the Bushmen of Southern Africa and the Urarina people of the Peruvian Amazon Basin. Shamanism holds that there is a spirit world that can be entered by certain chosen and trained individuals, shamans. Shamans are believed to live between two worlds, the natural and spiritual world by entering the *axis mundi* (trance state) and thus have special knowledge and abilities to deal with spirits.<sup>8</sup> In this state Shamans hope to obtain special knowledge and powers that would help the community and were centered on worldly desires, such as rain for crops, more livestock and fertility.<sup>9</sup>

The didactic nature of shamanistic aesthetic objects, images and rituals is an important reference for my own data based work. Objects, images and rituals of aesthetic value had a central role in pre-literate shamanistic communities and they were always internally related with the shamanistic worldview as they were made for political, social, utilitarian and/or didactic reasons.<sup>10</sup> Shamanistic practices reflect the communities' identity, individual identity, and the communities' relationship to their environment. These practices also connected the community to their tribal history, as well as to the spiritual world of their ancestors.<sup>11</sup> Also important for my work are the cultural signifiers embedded in the ritual practices, objects and images of these cultures as I appropriate

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<sup>8</sup> *The Archaeology of Shamanism*, Price pp. 112-3

<sup>9</sup> *Shamanism The Beginnings of Art*, Lommel pp. 74-100

<sup>10</sup> *Aboriginal Art*, Caruana p. 7

<sup>11</sup> *Aboriginal Art*, Caruana p. 10

motifs, color systems and rituals from African, Pacific Islands, Native American and Asian shamanistic communities, along with their pre-literate iconic cognitive mode.

One of the difficulties in understanding the aesthetic objects and images of African culture is that one must also understand their cultural context; thus it is necessary to study African cultural anthropology along with their aesthetics. Based on field research in Africa, shamanism and animism had a central role in the ritual practices, objects and images of the African people. The repetitive and geometric based visual patterns present in African tattoos, make-up designs [fig. 23], textiles [fig. 24], sculptures, masks, shields [fig. 25], pottery, wall reliefs and paintings communicate myths, history, and social status within African culture. One example of the social significance of African artifacts is the geometric beaded designed elephant masks [fig. 26-27] of the Cameroon, which are similar to the beaded designs of my painting *The Temporal, the Quantitative, Ideals and Quarks* [fig. 9-10]. These masks are used in a performance designed to show the social hierarchy, where membership into the society is limited to the wealthiest and those with the highest social status.<sup>12</sup>

The indigenous people of the Pacific Islands, such as Polynesia, Micronesia, Melanesia, and Australia share the same Lapita cultural ancestors.<sup>13</sup> The shamanistic Australian culture is centered on dreaming, which connects them to the spiritual, the natural and moral order of the cosmos. Dreaming allows the society to retain a harmonious equilibrium with the universe, connecting communities to their ancestors.<sup>14</sup> Mapping data, such as in *World Population 3000 BCE to 2008 CE* [fig. 6], is also

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<sup>12</sup> *The Sign of the Leopard Beaded Art of Cameroon*, Foss pp. 17-9

<sup>13</sup> *The Lapita Cultural Complex*, Spriggs pp. 202-3

<sup>14</sup> *Aboriginal Art*, Caruana p.10

common among Australian Aborigines. Indigenous maps often depict their relationship to their land and the community, which is sanctioned by Dreaming..<sup>15</sup> Charles Mardigan's *Billabong* [fig. 28] is an example of the didactic nature of Australian aesthetic imagery as it depicts waterholes in the Charles homeland country of Yenmenni along with boundaries of his clan's estate.<sup>16</sup>

Taking place in South America, central Mexico and the central plains of North America, Peyote was used in ritual ceremonies to connect with the gods, ancestors, obtaining guidance and healing. Still practiced within the Native American Church where participants consume the hallucinogenic entheogens in an all night ritual where one will often sit in one position without moving while there is repetitive chanting and drumming.<sup>17</sup> Paintings that are inspired by the ceremony are important for the development of my color systems.

James Mooney, the first anthropologist to discuss the symbolic nature of peyote art, describes the Kiowa rattle with the help a Kiowa Peyotist [fig. 29]. He discovers that green lines are associated with the falling rain, that yellow circles and yellow humming birds are associated with the sun, and red zig-zag lines are associated with the ceremonial songs.<sup>18</sup> The rainbow colored patterns of peyotist beadwork is associated with the flames of the ritual fire: yellow meaning lightening, green meaning peyote, and blue symbolizing water.<sup>19</sup> However, these symbol systems of signs and meaning are more than

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<sup>15</sup> *Dreamings*, Sutton pp. 80-1

<sup>16</sup> *Aboriginal Art*, Caruana pp. 93-4

<sup>17</sup> *Peyote Religious Art*, Swan, p. 3

<sup>18</sup> *Peyote Religious Art*, Swan, p. 94

<sup>19</sup> *Peyote Religious Art*, Swan, p. 95

interpretations, they are a method of inquiry that attempts to bring the mysteries of their universe into the lucid consciousness of the individuals and thus the community.<sup>20</sup>

The rainbow patterns are most evident in the diptych, *Brain Wave Strips 2008 and 2009* [fig. 7-8] where I assigned a color to nine companies that were helped out by the US bailout. Depending on the value of the stock during the close of the month, I assigned a value to the color so that when one stands back one can see the fluctuation of the stocks over the years of 2008 and 2009. This creates the illusion of strips fluctuating in space in a figure ground relationship. The iconic saturated color combination references the rainbow colored patterns of the peyotist beadwork, associated with the peyote ritual fire. Next to each color strip of ritual repetition and concentration, I placed the symbol for the company it represents. Placing the symbol next to the color strip is an attempt to move from a purely iconic visual language to an indexical relationship where one can start to decipher a symbolic language from the visual phenomenon.

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<sup>20</sup> *Peyote Religious Art*, Swan p. 94

## V. The Transition from the Iconic to the Symbolic

As oral traditions began to be written down human communication took on a new form. Language became more sophisticated and human understanding started to shift towards a symbolic universe. This shift can be associated with the indexical cognitive mode where human beings became fluent in iconic associations and started to make symbolic causal links between events and their sources. Yet these causal relationships have not reached the level of science or philosophy as they are still closely linked to the emotional/physical level, not making a full leap into symbol-symbol based relationships.<sup>21</sup>

The first writing systems that developed took on the shape of ideographic and/or mnemonic symbols. Egyptian hieroglyphs are considered one of the earliest forms of writing systems. Developing sometime around 4000 BCE, Egyptian Hieroglyphics combined both logographic and alphabetic elements. Logographic represent ideas directly, such as visual pictures that represent the signified, while alphabetic represent phoneme in spoken language.<sup>22</sup> The combinations of logographic and alphabetic elements are both present in my work as modes of symbolic systems.

As oral traditions started to canonize their ethical codes and rituals in written form, different writing styles became prevalent throughout the world. Examples of the different forms of calligraphy can be found in China, Japan and India. Different forms of calligraphy were practice to honor the content of the subject, such as practiced by Jewish, Christian and Islamic [fig. 30] scribes. These religious traditions placed highly structured

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<sup>21</sup> *Symbolic Species*, Deason pp. 69-100

<sup>22</sup> *Egyptian Hieroglyphics*, Scott pp. 12-3

emphasis on copying religious documents because they were believed to be the very word of God.<sup>23</sup> Creating hybrid languages, I borrow from the different forms of calligraphy found throughout the world, such as in *The Nasdaq, the S&P and US Oil Companies 2008* [fig. 18] and *Land Size, Population, Military Expenditures, Labor Force, Export, Education Expenditures, Internet Users* [fig. 15-17] where I track CO2 levels by using different forms of calligraphy found throughout the world.

Signs were also invented to represent numeric values. Early civilizations found ways to quantify the physical and social worlds. Some of the earliest forms of mathematics can be found on the Lebombo bones found in Swaziland of South Africa that date back to 35,000 BCE [fig. 31]. It is believed that these early tally systems were a way to calculate the quantity of a food source in a hunter-gatherer society and to track the days.<sup>24</sup>

Different numeric systems developed in different regions. Bozena Brydlovan developed a perennial theory that shows how these different numeric forms of the world have a universal geometric nature [fig. 32]. Brydlovan believes that the present western number forms are derived from the 45-degree angle that can be found in other numeric systems throughout the world. According to the Brydlovan the 45-degree angle has mystical significance that crosses over into the fields of Anthropology, Chemistry, Botany, Cosmology, Symbology and Comparative Religion showing that numeric forms all have a common universal origin.<sup>25</sup> In my own work I reference different numeric systems as a way of representing data, as well as Brydlovan's 45-degree theory.

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<sup>23</sup> Islamic Calligraphy, Schimmel pp, 1-3

<sup>24</sup> *Fossil Man in the Lebombo Mountains*, Cooke pp. 6-8

<sup>25</sup> *Io Unveiled and Brydlovan Theory*, Brydlova pp. 10-13

As number systems started to develop so did ways of marking the days and the years. According to Alexander Marshack's research, our earliest indication of a calendar can be found in Paleolithic cave markings. Markings made in linear rows with varying numbers, spacing, distinction in scribe, variations in size, form, and orientation could be an indication of tallying days in a lunar cycle.<sup>26</sup> Later more reliable solar calendars started to come into use that determined the earth's position as it rotated around the sun.<sup>27</sup> The archaic calendars of Central and South America incorporated observations of the stars and planets, such as the Mayan and Aztec calendars that are based on two systems of 365 and 260-day cycles. These calendars were used to determine when the proper day for embarking on wars or other activities.<sup>28</sup> I often reference calendar structures as a way of representing time and marking events.

The use of the calendar structure and Brydlov's 45-degree theory can be seen in *Wheat, Rice and Corn Production in China 1953-2006* [fig. 11-12]. At the edge of the spiral grid I marked the values of the squares, with the Brydlov's number system, that are apart of a color system that marks wheat, rice and corn production in China between 1953 to 2006. The colors are loosely based off the light spectrum, where lower color frequencies are associated with lower values and higher color frequencies are associated with higher values. This creates a sensation of a receding spiral tile floor where the square figures vibrate with the pastel blue, pink, violet and off white ground. The blue and bright pink circles of stars represent two social structures, iconically marking the important election years of the US and China. My interest in agriculture is how the

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<sup>26</sup> *Mapping Time*, Richards pp. 130-2

<sup>27</sup> *Mapping Time*, Richards pp. 165-9

<sup>28</sup> *Mapping Time*, Richards pp. 186-192

physical world affects our cognitive abilities. I am also interested in how the cultivation of crops and food surplus effect society as a whole throughout history, lending towards the relationship between the physical and social worlds.

Similar in some respects to calendars, Feng Shui is an ancient Chinese system that is believed to improve one's life by drawing upon the laws of astronomy to find a relationship between humanity and the universe. It is an attempt to combine both science and intuition.<sup>29</sup> Developing later than Feng Shui, the Zodiac developed in Babylonia and spread towards the East to Persia and the Mediterranean via Alexander the Great.<sup>30</sup> The Zodiac is an ecliptic coordinating system that depicts the rings of constellations as the sun moves across the sky in a year [fig. 33]. The Zodiac takes in account the position of the sun, stars, moon and planets at any given time to understand social events and to predict the future.<sup>31</sup> Along with early forms of astronomy, numerologies started to develop as an attempt to understand the relationship between numbers and events in the physical/social world. In my own work I reference calendars, numerologies and astronomy to make a relationship between social interaction and the celestial plain.

The use of the calendar structure, astrological maps and the iconic to indexical cognitive modes are evident in *Catholic, Baptist and Lutheran Churches in Early America; German Philosophers; and the US Market* [fig. 3-4]. The spiral grid structure tracks each year where the pink squares represent the years that the US has been at war and the dark violet squares represent years of market recessions. This color language is solely at the iconic referential mode where the visual sensory phenomenon is primary.

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<sup>29</sup> *Fengshui in China*, Bruun p. 272

<sup>30</sup> *Mapping Time*, Richards p. 38

<sup>31</sup> *Mapping Time*, Richards pp. 26-9

The stars, molecular structures and snowflakes motifs are tracking the number of Catholic, Baptist and Lutheran Churches for each decade in early America before the revolution. This form of tracking references the iconic cognitive mode as one can only make relationships based on visual relative location to each motif, thus I have written the number of churches for each decade to clarify the data. The written symbols are a move from the purely iconic visual language to the indexical where one can start to make distinctions. As one moves out from the center they notice different colored diamonds, related to the five Chinese elements, which are tracking the life span of five German philosophers that I was reading during the making of the work that represent the symbol-symbol cognitive mode. In a way I reference all three cognitive modes without leaping into symbol-symbol based relationships, only showing a cognitive evolution from iconic to indexical modes.

As human beings searched for a better understanding of their environment, science started to develop. One of the earliest forms of science is alchemy, the pursuit of turning basic elements into gold. The alchemists during the Middle Ages in Europe used symbols to represent the different elements, such as sulfur, mercury, and salt, used in creating different substances.<sup>32</sup> These symbols were also associated with the different Zodiac signs and astrology, lending towards the idea that alchemists held that human beings and the universe were interconnected.<sup>33</sup> This form of scientific inquiry is related with a move towards the referential mode of iconic to indexical in their understanding of causal relationships between elements. Much like the alchemist, I am coming to

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<sup>32</sup> *The Spiritual in Art*, Tuchman p. 368

<sup>33</sup> *Mapping Time*, Richards pp. 26-7

understand the universe and self through an alchemical data practice where I juxtapose different forms of information together.

A form of spiritual alchemy that comes out of Jewish mysticism, the *Zohar* is one of the most sophisticated forms of esoteric literature in the world. It is a dense work comprised of four layers, which may be present simultaneously in any passage. The first layer, *Peshat*, is the literal translation of the Torah without interpretation, (i.e. the fabric); the second layer, *Remez*, is the hidden meaning behind the words, (i.e. the body); the third, *Drash*, is the Midrashic references used by the author(s) of the *Zohar*; and last, *Sod*, is the mystical understanding (i.e. the transcendent).<sup>34</sup> This way of layering content is often used in my work as I associate symbols with fabric, the body forms with meaning and final transcendence represented with saturated colors.

Also a form of spiritual alchemy, but holding no relation historically to Jewish mysticism is the Hindu Tantric subtle body [fig. 34]. Known from both scrolls and miniature paintings, the subtle body is the mapping and instructional chart of various psychic centers, *chakra*, that are depicted as lotus and the currents of energy that run through the body in a spiral fashion. According to Tantra, one must transverse these different psychic centers to obtain supreme bliss.<sup>35</sup> Starting at the base of the spine between the anal orifice and genitals, *Muladhara*, the first *chakra* is represented as a lotus with four red pedals. It is associated with the complex of fear and guilt of the primal physical self that must be overcome. *Svadhithana*, the second *chakra*, is based in the genital region or root of the penis. It contains emotions and subconscious desires, such as

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<sup>34</sup> *Zohar*, Matt pp.123-126, 251-253 & Lecture Notes, Professor Goldberg, April 12 & May 17, 2007

<sup>35</sup> *The Tantric Way*, Mookerjee pp. 66-6

sexual desires that must be overcome. The third *chakra*, *Manipura* (Jewel City), is located at the navel and associated with energy and the will to power that must be overcome to move up. The fourth *chakra*, *Anahata*, is located at the heart in the Hindu tradition and is associated with the intuitive mind, divine love and compassion. Located at the throat, the fifth *chakra* *Visuddha* or *Bharati* is associated with ether and the control of the sense of hearing. At the center between the eyebrows and the most important according to Tantric Hinduism, the sixth *chakra* *Ajna* is associated with the mind. It represents the different states of consciousness accomplished through meditation and union with Brahman. The seventh and last in the Hindu tradition, *Sahasrara*, *Satcakrabheda* or *Cakrabheda chakra* symbolizes transcendence, detachment from illusion, where polarities merge in cosmic consciousness.<sup>36</sup> I often reference the *chakra* system as it relates to the different energy centers and the body.

Influenced by the Hindu chakra system, the theosophists (Theosophy is discussed further on page 30) Annie Besant and Charles W. Leadbeater, developed the concept of thought-forms as a way of describing color patterns and forms within one's aura in relationship to one's thoughts and emotions in their book *Thought-Forms* (1901).<sup>37</sup> In Leadbeater's 1927 published book *The Chakras*, he discusses thought-forms and how they relate to the Hindu chakra system. He associates the seven chakras starting with the color red then orange, yellow, green, blue, indigo and violet.<sup>38</sup> In my own work I use the colors associated with the chakras discussed by Leadbeater as a way of organizing information, as well as of representing numeric values.

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<sup>36</sup> *Kundalini*, Mookerjee pp. 39-44

<sup>37</sup> *The Spiritual in Art*, Tuckman p. 390

<sup>38</sup> *The Chakras*, Leadbeater

This hierarchical structure of the Hindu Tantric subtle body and the indexical cognitive mode are referenced in *Land Size*,... [fig. 15-17]. Each circular form represents a *chakra* center where the content is tracked throughout the system with a color-coded pie graph structure that also relates to the *chakra* emotive and operative effects. As the circular shapes reference the body, I use a form of dotting that is prevalent within the shamanistic communities of Africa and Australia, referencing the bodily iconic mode. The relationship between the content measured is making a move from iconic to the indexical as the data has taken physical form and is being compared with other forms of data, but is not based on a symbol-symbol cognitive relationship. The purpose of this painting is to represent a move from the iconic to indexical cognitive mode.

Also relevant are the Hindu and Buddhist cosmologies that are usually depicted as flat circular diagrams that relate to the Indian idea of how the earth was laid out.<sup>39</sup> Jain cosmologies often take on the form of trees, rivers, grids and figures that show the different divisions of the universe [fig. 35-37]. As some of these maps reference the objective world, they are purely subjective diagrams of the cosmos.<sup>40</sup>

Similar to cosmologies, Hindu yantras and Buddhist mandalas were used as meditation tools that represent a personification or aspect of the divine. They act as a model for worship and function as a kind of chart for the evolution of Self. Yantras are geometric designs based on a point, line, circle, triangle, square and lotus symbol that are juxtaposed in an overlapped arrangement that are either constructed before meditation or are constructed during the act of meditation [fig. 38].<sup>41</sup>

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<sup>39</sup> *The Art of Tantra*, Rawson p. 138-9

<sup>40</sup> *The Art of Tantra*, Rawson p. 139

<sup>41</sup> *The Tantric Way*, Mookerjee p. 50-1

Buddhist mandalas [fig. 39] are represented differently depending on their region of origin, however they are all based on the same circular structure with Mount Meru at the center. The Tibetan mandala depicts five Buddha's that represent different attributes on the path towards Enlightenment. This structure is evident in the stacked circular forms in *Labor Force, Stock of Money, Purchasing Power and Surplus*, where I reference the color system of the five Buddha's in order. The first Buddha is the Green *Amoghasiddhi*, of All-Accomplishing Wisdom who resides in the northern direction with green representing balance, harmony, vigor and youth. The second Buddha is the Yellow *Ratnasambhava*, representing renunciation and rootedness, presides in the southern direction. The third Buddha is the blue *Aksobhya* of the east, blue representing infinity, ascension, and healing. Enthroned by the red *Amitabha* is the fourth Buddha of the western direction. Red represents the life force, preservation and the sacred; he is the Buddha of Discriminating Wisdom who obscures greed and the element of fire. At the center of the mandala is the white *Vairocana*. White representing knowledge, purity, and longevity, he is the Buddha of Wisdom of the Universal Law, and obscures ignorance and delusion. The five Buddha's are depicted within the garden walls that are encircled by lotus pedals.<sup>42</sup>

Stupas [fig. 40], built to contain Buddhist relics, can be found through out Asia and is an important form in my work. The stupas function much like a mandala with the five towers representing Mt. Meru. There are five symbolic layers of the central tower that represents different layers of purification: the bottom represents the earth, the dome represents water, the conical spire represents fire, the crescent moon and lotus represents

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<sup>42</sup> *Journey into Consciousness*, Breaux pp. 37-40, 79-81, 101-104, 123-126, 156, 166

air, and the top sun represents space. The stupa also has a storage space where *Tsa-Tsas* (offerings) are placed. The shape of the stupa represents the Buddha sitting in meditation with the four steps above the base representing the legs and the top of the spire representing his crown.<sup>43</sup>

In *Cosmic Sushi Roll with Extra Wasabi* [fig. 1-2], I represent the data in the form of a stupa with five circles descending from the sky, associated with the five Buddha's of the Tantric mandala. The fifteen rings represent fifteen countries, associated with the fifteen days of the Hebrew month on which the full moon appears. The colors of the bands reference the peyote rainbow color code that represents the sacred fire. The move from iconic to the indexical is represented in the Native American color codes that are labeled on the left hand side of the bottom rings. The language is primarily color based, but one can start to make distinctions and relationships between the information represented. The gold oval shapes that are optically wrapping back in a whirling motion are also in an iconic mode as they show a pattern of crescents that track CO2 levels. Yet I wrote the dates on each shape to bring it into the indexical mode.

The lingam [fig. 41] is an important symbol for the generating power of the universe that is worshiped in Hindu temples. A phallic shaped sculpture is associated with the god Shiva and stands on the circular female principle, the *yoni*, which gives rise to movement and vibration. During rituals milk and/or honey are often poured on top of the lingam.<sup>44</sup> I use the lingam form in *Composition of Rural/Abject Impoverished Indian's Expenditures on Food by Household Types (Crops and Food Necessities, Dairy,*

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<sup>43</sup> *Myth and Symbols*, Zimmer pp. 199-200 & *The Symbolism of the Stupa*, Snodgrass pp. 1-358

<sup>44</sup> *The Tantric Way*, Mookerjee p. 36

*Meat, Sugar, Oilseeds, Fruits/Vegetables and Grains*) [fig. 20], where I indicate grooves that measure the proportions of the different food types along the shaft. This is a common ritual object among the rurally impoverished in India and the reference to their diet is the relationship our diet has on our cognitive abilities, as well as the social realities and spiritual ideals. The lingam shape is cast in indigo soy wax to represent the color of Shiva, but it is also associated with the color of the sixth *chakra* that is associated with knowledge, making a relationship between the data and the mind. As they often have flower garlands that hang around the lingam base, I have encoded a color language that tracks some stock delta EEG wave cycles with the different colored flowers. Delta brain waves are often associated with deeply relaxing moments of meditation and are found during the learning process.<sup>45</sup>

Tai Chi Chun is an interest of mine for being a coded ritual that involves slow body movements. It has developed in such a way that it incorporates the I Ching and consists of a number of different postures that are done in slow transitions. The Eight Trigrams are an important element of the Tai Chi sets that represent the eight directions and colors: *Chien Khien* is South and green, *Sun* is southwest and lime green, *K'an Khan* is west and yellow, *Ken* is northwest and orange, *K'un Khwan* is north and red, *Chen Kan* is northeast and purple, *Li* is east and blue, and *Tui* is southeast and turquoise [fig. 42]. These eight trigrams are also associated with the seasons, different forms of Yin-Yang, the eight animals of the Chinese calendar, and different parts of the body. The five

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<sup>45</sup> *Independent Delta/Theta Rhythms*, Mormann

elements of wood, fire, earth, metal and water are also associated with *Chien, Li, K'un, Ken and K'an*.<sup>46</sup>

In *Tai Chi Performance (SSE Composite Index 2009)* [fig. 65] I use the eight trigrams of the I Ching to associate the colors of the shapes that are placed on the ground that track the SSE Composite Index during the year of 2009 with the different sessions. The shapes act much like a graph of the index as the Tai Chi performer moves through each shape that represents the end of a two-week period. Each posture, which is related to one of the animals of the Chinese calendar, is roughly related to the value of the index as well.

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<sup>46</sup> *The Complete Book of Tai Chi Chuan*, Kiew Kit

## VI. Language and Being at the Symbol-Symbol Mode

Historically human beings have come to understand their environment and internal world through iconic relationships that are represented in the aesthetic objects, images, rituals and oral traditions of shamanistic tribes. Followed second by the Brahmin and priestly sects with elaborate indexical rituals and symbol systems that were first oral and then written down. The third major development in human cognition is through symbol-symbol based relationships developed by philosophers and scientists. It is at this stage that the elusive metaphysical questions of the nature of consciousness and the relationship between language and being are on a purely symbolic level. It is through the development of refined symbolic relationships that humanity has come to understand social and mind/body phenomenon. Because I deal with the relationship between language and sensation in my work, the symbol-symbol manifestation of the issue is also relevant as I borrow from these philosophical systems in making my work.

The symbol-symbol based discussion of mind in western culture can be traced back to the Pre-Socratic philosopher Parmenides of Elea (5<sup>th</sup> century BCE) and has taken shape within such fields as behaviorism, dualism, idealism, monism and phenomenology. Influenced by Parmenides, both Plato, in his *Allegory in a Cave*, and Aristotle dealt with the subject of language and being, and laid the ground work for what later became the field of cognitive science.<sup>47</sup>

Rene Descartes (1596-1650) is known as the father of western philosophy for specifically dealing with the issue of how the mind and the body interact. In his first

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<sup>47</sup> *Oxford Companion to Philosophy*, Honderich pp. 645-6, 683-686, 53-57

*Meditation*; Descartes attempts to find certainty by doubt<sup>48</sup> In the second *Meditation* Descartes attempts to further his argument of how the mind has true understanding in contrast from sensory perceptions of the body. He then points out that his existents is dependent on his thinking and thus we have the famous statement, “If I am thinking, then I (necessarily) exist”.<sup>49</sup> That is to say existence, a metaphysical question, cannot be conceivable without thinking, an epistemological question.

During the European Enlightenment Immanuel Kant (1724-1804) elaborates on the mind/body issue in his, *Critique of Pure Reason* that lays out a metaphysical diagram for the subjective and objective world. In laying out this metaphysical foundation Kant distinguishes two forms of knowledge, a prior and posteriori. The a prior form of knowledge is what we know in and of it’s self, such as mathematics. On the other hand posteriori knowledge is collected by observations of the experienced world.<sup>50</sup> Within the area of a prior knowledge, Kant goes on to create cognitive categories for the inherent nature and structure of the mind, the beginning of German Idealism.<sup>51</sup>

Continuing in the German tradition, Hegel (1770-1831) deals with the topic of being (consciousness) and language (mind) in his 1807 published work, *Phenomenology of Mind*. In *Phenomenology of Mind* Hegel attempts to deal with knowledge and how it appears to consciousness as one moves through different cognitive modes from self-critizing phenomenal knowing to knowledge of the Absolute.<sup>52</sup> Close to Pierce’s referential associations, Hegel categorizes the evolution of consciousness as it moves

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<sup>48</sup> *Meditation*, Descartes pp. 87-97

<sup>49</sup> *Meditation*, Descartes pp. 99-117

<sup>50</sup> *Critique of Pure Reason*, Kant p. 21-35

<sup>51</sup> *Critique of Pure Reason*, Kant pp. 52-96

<sup>52</sup> *Phenomenology*, Kockelmans p. 24

through four stages, from sensory to perception to understanding and finally self-consciousness.<sup>53</sup> As Hegel is describing these stages of knowledge, he is also describing different cognitive states for processing sensory and symbolic information.<sup>54</sup>

Hegel left us a historical start to the phenomenological approach; however it was Edmund Husserl (1859-1938) that is known as the father of phenomenology. In Husserl's first edition of *Logical Investigation* he lays out his ideas concerning the structure of consciousness where he asserts that one must make a distinction between the act of consciousness and phenomenon observed.<sup>55</sup> Any knowledge of essences can only be accomplished by putting aside any ideas of an objective world. As an alternative to a cogito, he seeks a precise analysis and description of bodily intuition that is neither inductive nor deductive<sup>56</sup>

Deeply influenced by phenomenology, Josef Albers (1888-1976) desired to expose the “discrepancy between physical fact and psychic effect.”<sup>57</sup> I have found his work on color interaction to be very helpful for understanding color relationships in my own work. Later Albers work proved imperative for hard-edge abstract painters in the 50's and 60's, and later conceptual and Op artist who drew on his work on perception.<sup>58</sup>

Husserl's student, Martin Heidegger (1889-1976) is also well known for discussing being and language (in the form of hermeneutics), as well as relating to Zen philosophy. In *Being and Time* Heidegger pursues the meaning of being, or the attempt to clarify the conditions under which one exists as a being by navigating towards a

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<sup>53</sup> *Phenomenology of Mind*, Hegel pp. 58-103

<sup>54</sup> *Phenomenology of Mind*, Hegel pp. 104-138

<sup>55</sup> *Logical Investigation*, Husserl pp. 279-81

<sup>56</sup> *Phenomenology*, Kockelmans pp. 29-30

<sup>57</sup> *History of Modern Art*, Arnason p.349

<sup>58</sup> *History of Modern Art*, Arnason p.349

primordial state that preceded logic and theory. Crucial for the primordial investigation is the relationship that being has with each human being at a given time. Because each human being has no access to being other than through their temporal state, the question of being is always in relationship to a human beings place in time, thus language and interpretation becomes crucial for individual understanding, key to Heidegger's existential phenomenology.<sup>59</sup>

In understanding how being and language interact, I have found Heidegger's discussion of Dasein very helpful for putting my work into a Western philosophical paradigm. As I create compositions that employ color saturation and other color relationships, my work always has a strong presence. At the same time it is a visual language that is tracking temporal or quantitative data that needs to be interpreted, I see my work and the concept of Dasein as synonymous.

As phenomenology was being developed, Ludwig Wittgenstein (1889-1951) was developing the field of linguistic analysis. In his first major work, *Tractatus Logico-Philosophicus*, Wittgenstein discusses the relationship between language and reality through seven propositions. The first three deal with a theory of language where Wittgenstein believes that the world is internally connected with a geometric structure of facts. Language has an innate logical geometric structure that we project on to the world, yet the linguistic structure it self does not change. The innate linguistic structure makes it impossible to get beyond the system, because any language used in this pursuit would

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<sup>59</sup> *Being and Time*, Heidegger pp. 13-23

only be confined to the same structural geometry, which is best *shown* in symbolic form.<sup>60</sup>

Wittgenstein's interest in showing logic in symbolic form, which soon developed into logical diagrams, came out of his difficulty with conveying his ideas to Barnett Russell.<sup>61</sup> Also a way for Wittgenstein to keep track of numerous variables at any given moment, I find this to be an interesting moment in Wittgenstein's philosophy. This is where the cognitive difference between verbal and visual communication became a part of his philosophical position. It is a point where Wittgenstein feels that his logical sequences can be best represented through visualization.

In a similar spirit, religious studies deals with the question of language and being as they attempt to elucidate religious or mystical phenomenon. Within religious studies there are two major schools of thought that attempt to understand this phenomenon: the ontological and constructivist views. Geoffrey Parrinder (1910-2005), an example of the ontological view, perceives mysticism as a seeking for union, where different religions strive toward it in different ways. Different religions have their own categories for understanding this union with the Divine.<sup>62</sup>

Yet, more recently the ontological investigation of the modernist has been challenged by the question of language. Linguistic analysis has been questioning our ability to know if there is an objective 'reality', replacing our picture of the world with one that is purely subjective. Steven Katz who argues that we cannot separate the descriptions of mystical states from the one having the experience takes on this more

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<sup>60</sup> *Tractatus Logico-Philosophicus*, Wittgenstein pp. 5-22

<sup>61</sup> *Wittgenstein in 90 Minutes*, Strathern

<sup>62</sup> *Mysticism and Religion*, Ellwood pp. 20-1

current constructivist position. Even if the descriptions are similar across different religious traditions, the experiences are unique to the individual.<sup>63</sup>

The work of Sigmund Freud (1856-1939) and Carl Jung (1875-1961) is helpful to keep in mind when considering religious thought and phenomena and how they relate to the structure of the psyche. Sigmund Freud, the father of psychoanalysis, is credited for discovering that we have memories and thoughts that are suppressed in the unconscious. Freud's model for the psyche is divided into three levels: the ego, the superego and the ID. The ego arises at the conscious level of the mind that is directly influenced by the external world that deals with reason and common sense. The ID is completely unconscious that is access through dreams and is related to our basic desires for sex, food and pleasure. The Super-Ego regulates the ID by incorporating ideals into the psyche that often resolves in guilt, as the Super-Ego is both conscious and unconscious.<sup>64</sup>

One of Freud's major beliefs was that our primary motivation in life was the libido, more or less suppressed in our unconscious mind. Jung disagreed with Freud that the libido was the primary motivating factor for adults. Jung went further into the psyche by borrowing from eastern metaphysical structures and developed ideas about archetypes and the collective unconscious.<sup>65</sup> Both Freud's and Jung's structure for understanding the unconscious mind are present in my work as I often make sexual references. However, I always make such references in the context of ideal shapes, such as in *Land Size...*, [fig. 15-17].

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<sup>63</sup> *Mysticism and Religion*, Ellwood pp. 18-9

<sup>64</sup> *The ego and the Id*, Freud pp. 11-36

<sup>65</sup> *Psychology of Religion*, Wulff p. 420

As we have continued to expand our understanding of the mind in relation to religious and mystical phenomenon, the field of neurology has been slowly mapping out the route of environmental electromagnetic stimuli within the brain to understand cognitive processes. Researchers have discovered that there is a relationship between meditation and brainwaves. N. N. Das and H. Gastaut found that yogis exhibited beta waves during periods of deep meditation.<sup>66</sup> The beta states are usually found during periods of intense concentration or mental agitation and are at their highest levels during periods of *Samadhi*.<sup>67</sup>

Brainwave research is referenced in the title and in the long horizontal format in *Brain Wave Strips 2008 to 2009* [fig. 7-8]. As scientists have found a correlation between brainwaves and states of consciousness it is easy to put the shamanistic experience into scientific terms. This painting makes a relationship between the iconic shamanistic rituals, yet it is also transitioning into the indexical with the symbols at the bottom that are associated with a company. The painting does not function on the symbol-symbol level, brainwave references only hint at the referential mode.

It is also relevant to mention that EEG researchers in 2009 have discovered that subjects during nondirective meditation sessions show theta rhythm patterns that are significantly greater in the temporal-central regions compared to the posterior region of the brain.<sup>68</sup> Theta patterns have become known to be associated with being in a relaxed, creative and meditative state. They are also found in the rodent hippocampus and

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<sup>66</sup> *Psychology of Religion*, Wulff pp. 177-9

<sup>67</sup> *Independent Delta/Theta Rhythms*, Mormann

<sup>68</sup> *Increased Theta and Alpha EEG*, Lagopoulos

entorhinal cortex during moments of mnemonic encoding and memory retrieval, both involved in learning.<sup>69</sup>

As the learning process is taking place at the physiological level of the brain, it is also taking place at the atomic and molecular level. The work of biochemists and atomic physicists has shown how complex adaptive systems are geared by molecular structures. Atoms are made up of networks of leptons and quarks. Molecules, which are made up of networks of atoms, organize themselves in even more complex networks. Genetic codes, the building blocks for life, are an example of a complicated network of molecules. Networks of molecules also produce hypersensitive mechs, the building blocks for cells.<sup>70</sup> At the cellular level, a very complicated system of water molecules, proteins, nucleic acid and carbohydrates within the cellular walls work together in a series of chemical processes to create life.<sup>71</sup> Related to the inter workings of cells, research done by cellular biologists Marc Kirschner and John Gerhart on microtubules (the structural components within cells) are amazed at how adaptive these systems are to learning.<sup>72</sup>

One of the most illusive questions is how do atoms and molecules know how to do this and how do complex networks learn from their environment? It is even stranger to consider that at the sub-atomic level, there is far more empty space between the electrons and the nucleus than there is matter. According to Ernest Rutherford, who created the first model for the atom, electrons orbit around the nucleus, “Like a few flies in a cathedral”.<sup>73</sup> It appears that there is more empty space than anything at all.

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<sup>69</sup> *Independent Delta/Theta Rhythms*, Mormann

<sup>70</sup> *Global Brain*, Bloom pp. 184-7

<sup>71</sup> *Global Brain*, Bloom p. 185

<sup>72</sup> *Global Brain*, Bloom p. 187

<sup>73</sup> *Dancing Wu Li Master* Zukav, p. 12

Yet, space is very important. In 1975 the work of the mathematical physicist, Mitchell Feigenbaum (b. 1944), discovered a constant ratio space between successive period-doubling bifurcations occurred at 4.66920160.... Based from this result, Feigenbaum was able to create a mathematical proof that could be extended to other mathematical functions that take place before random characteristics. This discovery allowed mathematicians, physicists, biologist, economists and chemists to be able to find connections between different kinds of irregular phenomenon. With the development of computers, these random appearing algorithms can be mapped to show fractal structures, which I often reference in my work [fig. 43]. These fractal structures can be found in natural forms, such as crystals, cauliflower, snowflakes, lightning, blood vessels and mountain ranges.<sup>74</sup>

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<sup>74</sup> *Chaos*, Gleick pp. 1-4, 157-75

## VII. Western Art and Visual Information

The scientific discoveries of geometric systems that crossover into the natural world are not far from the discoveries of the western occultist Helena Blavatsky (1831-1891). In 1877 Blavatsky wrote *Isis Unveiled* that discusses how mystics and philosophers have a common spiritual connection.<sup>75</sup> In 1888 Blavatsky published, *The Secret Doctrine*, which describes the universe in seven stages where there is a departure from God into materialization, crystallization and then back into God, as well as the geometric nature of reality.<sup>76</sup>

Establishing the Theosophical Society in New York City in 1875, Blavatsky claimed to have psychic abilities and organized the society to explain mediumistic phenomena. Ultimately the society was a perennial movement that pursued a comparative study of religion, philosophy, and science. Culminating into a universal brotherhood that investigated the unknown spiritual forces in men/women and nature.<sup>77</sup>

One Swiss artist that was influenced by Theosophy was Hilma af Klint (1862-1944). As she explored the conscious and unconscious, Klint developed mediumistic abilities with a group of four other women that formed the 'the Five'. Using a psychograph (an instrument for recording spirit writings) and obtaining trance states, 'the Five' would call upon a spirit leader to guide their hand in drawing a new visual language

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<sup>75</sup> Blavatsky, *Isis Unveiled*

<sup>76</sup> *The Spiritual in Art*, Tuchman pp. 388-9

<sup>77</sup> *The Spiritual in Art*, Tuchman pp. 388-9

as a collective [fig. 44]. Throughout her work is the theme of duality, where a perfect balance between opposites allows for transcendence of the physical world.<sup>78</sup>

Piet Mondrian (1872-1944) was also greatly influenced by the Dutch Theosophist, Schoenmaekers, and joined the theosophical society in Amsterdam in 1909 and founded the journal *De Stijl*, along with Theo van Doesburg. Mondrian adopted the term neoplasticism to describe his theories of dual opposition, striving to dematerialize the physical appearance of the world to show the geometry of the immaterial world [fig. 45].<sup>79</sup> Inspired by Blavatsky's seven stages of evolution in *The Secret Doctrine*, Mondrian strives to return to the spiritual abstract stage from the material to a harmonious unity.<sup>80</sup> Hilma af Klint and Mondrian are both key figures in influencing my geometric abstraction work.

After World War II American artists were looking for a new way to express universals. In my own work I make formal references to both Minimalists and Abstract Expressionists who employed systems in their work, such as Frank Stella [fig. 46], Ellsworth Kelly [fig. 47], Agnes Martin [fig. 48], Kenneth Noland [fig. 49] and Barnett Newman [fig. 50]. This group of American based artists did not associate themselves with Blavatsky or occult philosophy that influenced Europeans. These artists were interested in Native American culture, Zen philosophy and Jungian psychology as they investigated the mysteries of a void that they saw as independent of the world.<sup>81</sup>

One American based artist during this time that has significantly influenced my work conceptually and formally is Alfred Jensen (1903-1981). Jensen believed that the

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<sup>78</sup> *The Spiritual in Art*, Tuchman pp. 155-162

<sup>79</sup> *Theories of Modern Art*, Chipp pp. 315-17

<sup>80</sup> *Theories of Modern Art*, Chipp pp. 321-323

<sup>81</sup> *The Spiritual in Art*, Tuchman p. 51

world of science and political philosophy could be unified with a universal visual language. Through using numerical systems, alchemical symbols and mandala forms, he brought events in the world into the realm of an ideal geometry [fig. 51-53].

Synthesizing the physical with the metaphysical, Jensen sees his work as a move from self-identity to self-integration through the ecstatic experience of color. Influenced by shamanistic cultures, western philosophy and eastern mysticism (such as Johann Wolfgang von Goethe's Theory of Color, Pythagorean geometries, Central American astronomical theories, the I Ching, magic squares, and Greek religious rituals) Jensen came to his hybrid body of work.<sup>82</sup>

More contemporary visual artists who have dealt with systems in their work are Peter Halley, Xylar Jane, John O'Connor, Don Suggs, Steve Roden, Virginia Katz, Tim Bavington and Alex Gray. Steve Ruden and John O'Conner have been the most significant for my work. Steven Roden [fig. 54] makes systematic sound and video works, along with paintings where the visual language is based off measurements taken from his body. John O'Conner [fig. 55] work interweaves different data sets of information in drawing that reference digital data representation and cellular structures.

The hand-made diagrams of scientists, mathematicians and inventors are an inspiration as well. Charles Darwin and his *Sketch for an Evolutionary Tree* [fig. 56], is an example of attempting to understand through visualizing how evolution works. Galileo Galilei's *Six Phases of the Moon, 1616 (57)* is one of the early astronomers attempts to understand the orbit of the moon and other planets.<sup>83</sup> Euclid, the

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<sup>82</sup> *The Spiritual in Art*, Tuchman pp. 319-21

<sup>83</sup> *The Drawing Book*, Kovats pp. 88-91

mathematician,<sup>84</sup> Alfred Wegener [fig. 58], John Clerk [fig. 59], Richard Lydrkker [fig. 60], Thomas Edison [fig. 61] have all made diagrams of their inventions and scientific discoveries.<sup>85</sup>

Leonardo Da Vinci (1452-1519) is one of the best examples of artist that embraced the sciences. In Da Vinci's journals one can find studies of anatomy, plants, hydraulic pumps, steam cannons, architecture and whirl pools to name a few.<sup>86</sup> The Codex Leicester [fig. 62] is the most famous collection of his scientific writings. It includes his thoughts on the properties of water, air, celestial light, astronomy and rocks.<sup>87</sup>

Mapping and systems have also found there way into conceptual art. Mark Lombardi (1951-2000) who worked with sociograms, is a key figure of influence for my work. Working mainly from financial and political information, Lombardi draws didactics that map social networks [fig. 63-64]. Holding a job as chief researcher for the 1973 Teapot Dome to Watergate exhibit and in 1976 worked as a general reference librarian at the Houston Public Library inspired his research based projects. Mark is noted for depicting the Iran-Contra scandal, Harken Energy scandal, BCCI scandal and the Savings and Loan scandal, to name a few, with his arching lines and subject bubbles.<sup>88</sup>

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<sup>84</sup> *Envisioning Information*, Tuft p. 17

<sup>85</sup> *The Drawing Book*, Kovats pp. 96-7, 100-1, 108, 136-7, 147

<sup>86</sup> *History of Italian Renaissance Art*, Hartt pp. 431-39

<sup>87</sup> *Leonardo da Vinci: The Codex Leicester*, Cottrell

<sup>88</sup> *Independent Curators International*, Robert Hobbs p. 128

## VIII. Structuralism and Post-Structuralism

The philosophical attempt to understand our cognitive modes in relationship to the physical world and create systems for understanding nature is dealt with by every well-known western philosopher. As the field of cognition has been taken over by neurophysiology, the social sciences have been searching for patterns in human behavior. Within the social sciences, structuralism became a popular movement during the 60's that attempted to analyze social subject matters as complex systems of parts that are interrelated. Structuralism has been subsequently applied to anthropology, psychology, sociology and psychoanalysis.

One of the best illustrations of the discussion between structuralism and the more historical approach of the post-structuralists is in *The Foucault-Chomsky debate on Human Nature*.<sup>89</sup> In the debate Noam Chomsky (b. 1928) presents his position that humans are 'pre-wired' with the capacity for language, which is innately a part of human nature. As he states, "...neural networks...[of] cognitive structure...make it possible for the child to acquire [linguistic] systems, ... I at least would have no hesitation in describing those properties as being a constituent element of human nature."<sup>90</sup> For Chomsky, language and human nature is derived from a biological structure. However, Foucault (1926-1984) disagrees with Chomsky's position of a constituent notion of human nature. Foucault finds it difficult to see a constant notion of human nature in the sciences because science continuous to change throughout history.<sup>91</sup> As I collect and

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<sup>89</sup> *The Foucault-Chomsky debate on Human Nature*, Chomsky and Foucault

<sup>90</sup> *The Foucault-Chomsky debate*, Chomsky p. 7

<sup>91</sup> *The Foucault-Chomsky debate*, Foucault pp. 6-7

represent social and physical data from the past and present, my work deals with both the geometric nature of language and history. Encapsulating both positions to understand the human condition, my interest in representing data is the attempt to deal with the raw elements by which complex systems recognize patterns in their environment.

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## IX. Conclusion

As I am attempting to hold numerous social and perceptual variables through a visual language, my project is internally related to cognitive science. Along with this cognitive investigation is an attempt to develop a systems theory that visualizes the fluidity of a non-discrete universe where social interaction correlates with the physical world. Borrowing visual motifs, color, numeric and linguistic systems from numerous shamanistic, religious, mystical, scientific, linguistic and philosophical traditions, I relate them to the qualities found in every meditation tradition: repetition and concentration. As meditation is often associated with transcendence of mind and body, I am more interested in how such techniques relate with cognitive abilities.

Basing my work on the different referential modes of iconic, indexical and symbol-symbol, I am interested in the different cognitive levels of development that take place during human evolution, as well as during childhood into adulthood. In my own work I am interested in returning to a state of infinite curiosity of how the world works that we often lose through institutionalization. As I am not certain how everything symbolically fits together at all times, I am interested in my work functioning as a process of my personal learning development, that I hope others will join in, as I move from sensory phenomenon of the body to a symbolic understanding of the world.

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## XI. Appendices

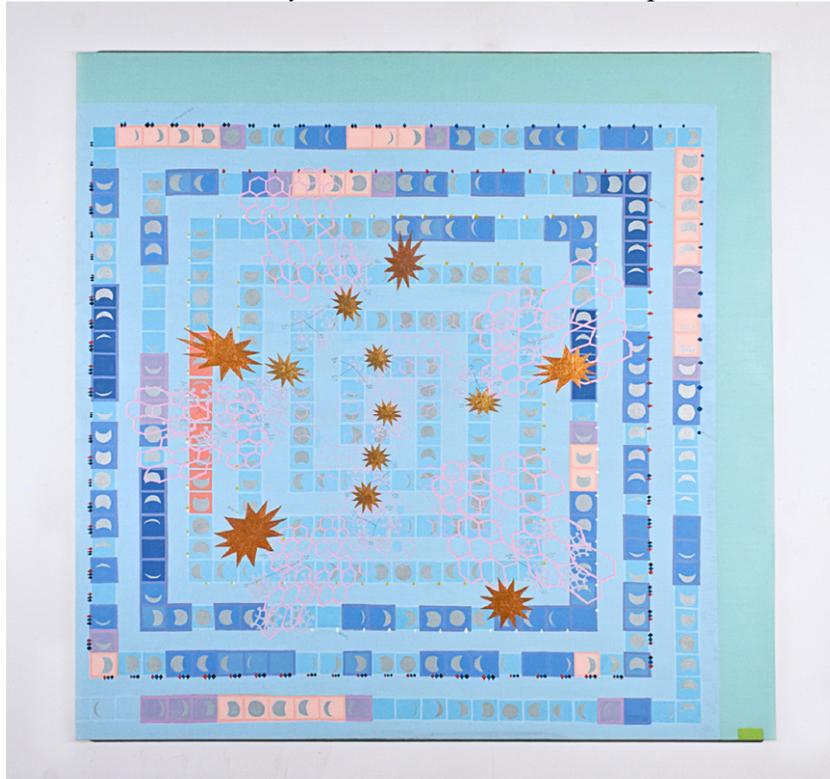
1. Brian Bulfer, *Cosmic Sushi Roll with Extra Wasabi*

[fig. 1] Bulfer, Brian. 2009-2010  
*Cosmic Sushi Roll with Extra Wasabi (Meat Production, Agricultural Land, Taxation,  
 Barley, Coffee Production and CO2)*  
 Oil on canvas 6'x8'

2. Brian Bulfer, Detail of *Cosmic Sushi Roll with Extra Wasabi*

[fig. 2] Bulfer, Brian. (Detail of *Cosmic Sushi Roll with Extra Wasabi*)

3. Brian Bulfer, *Churches in Early America; German Philosophers; and the US Market*



[fig. 3] Bulfer, Brian. 2009

*Catholic, Baptist and Lutheran Churches in Early America; German Philosophers; and the US Market*  
Oil on canvas 66"x66"

4. Brian Bulfer, Detail of *Churches in Early America, ...*



[fig. 4] Bulfer, Brian. (Detail of *Catholic, Baptist and Lutheran Churches in Early America; German Philosophers; and the US Market*)

5. Brian Bulfer, *World Population 3000 BCE to 2008 CE*



[fig. 5] Bulfer, Brian. 2009-2010  
*World Population 3000 BCE to 2008 CE*  
Oil on canvas 90"x66"

6. Brian Bulfer, Detail of *World Population 3000 BCE to 2008 CE*



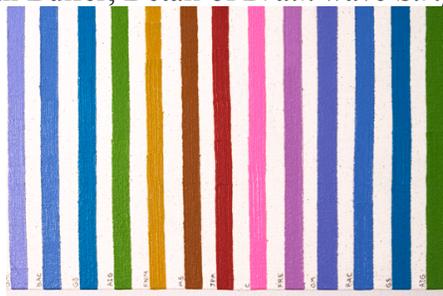
[fig. 6] Bulfer, Brian. (Detail of *World Population 3000 BCE to 2008 CE*)

7. Brian Bulfer, *Brain wave Strips* 2008



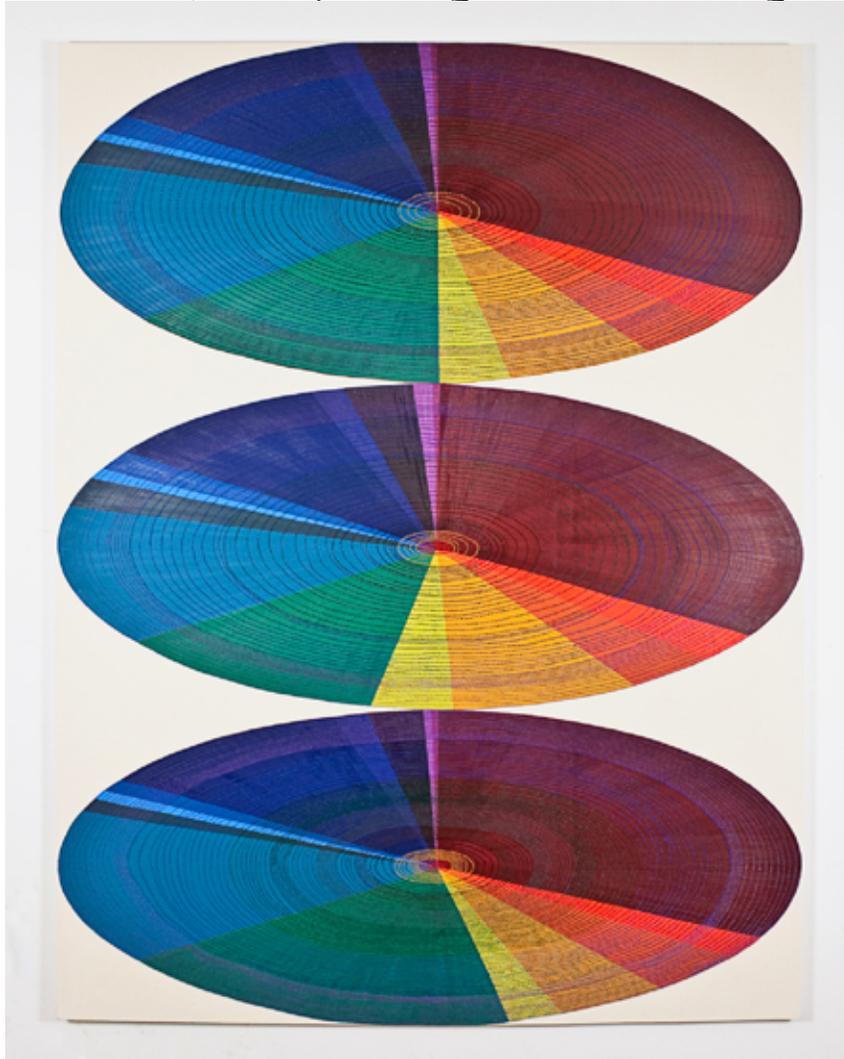
[fig. 7] Bulfer, Brian. 2010  
*Brain wave Strips* 2008  
Oil on canvas 8'x1'

8. Brian Bulfer, Detail of *Brain wave Strips* 2008



[fig. 8] Bulfer, Brian. (Detail of *Brain Waves Strips* 2009)

9. Brian Bulfer, *The Temporal, the Quantitative, Ideals and Quarks*



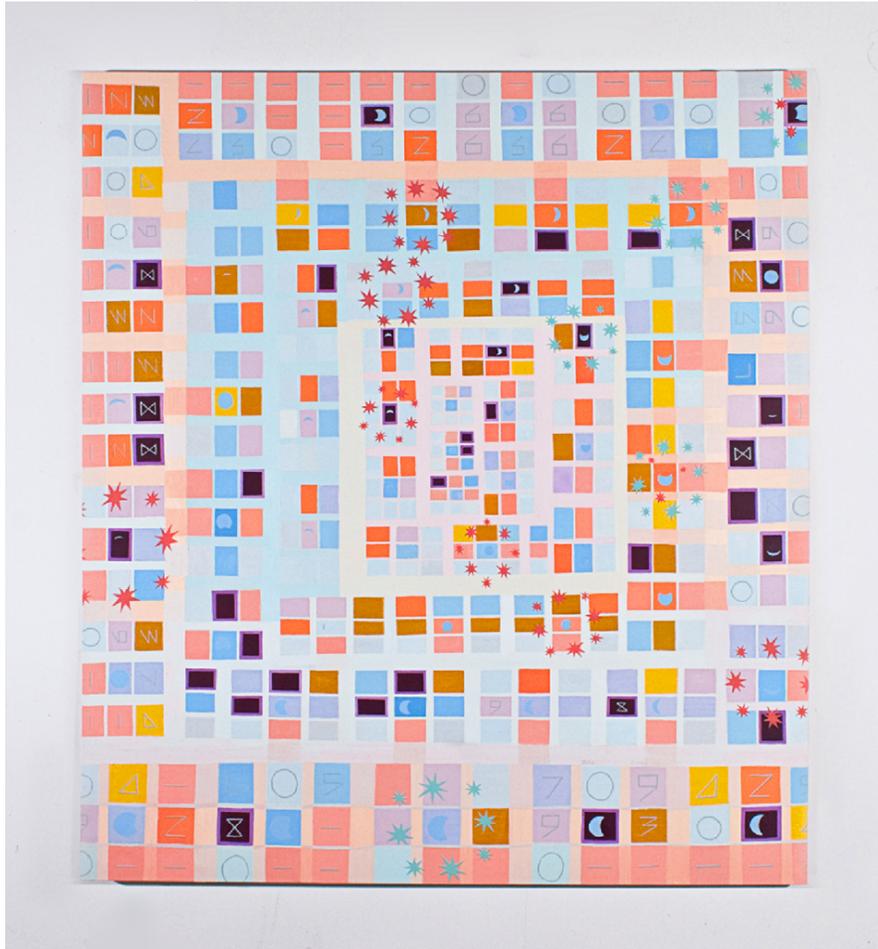
[fig. 9] Bulfer, Brian. 2010  
*The Temporal, the Quantitative, Ideals and Quarks*  
Oil on canvas 6'x8'

10. Brian Bulfer, Detail of *The Temporal, the Quantitative, Ideals and Quarks*



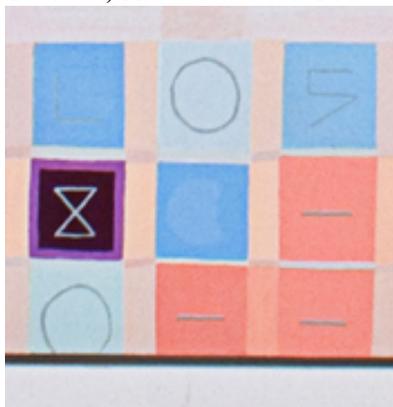
[fig. 10] Bulfer, Brian. (Detail of *The Temporal, the Quantitative, Ideals and Quarks*)

11. Brian Bulfer, *Wheat, Rice and Corn Production in China 1953-2006*



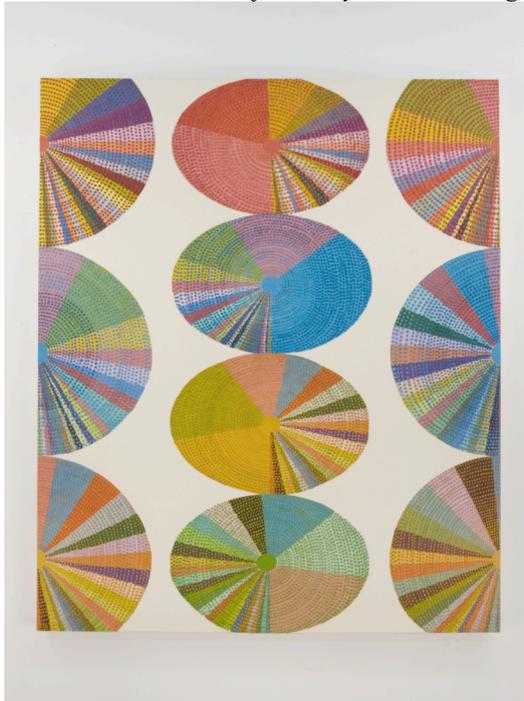
[fig. 11] Bulfer, Brian. 2009  
 Wheat, Rice and Corn Production in China 1953-2006  
 Oil of canvas 54"x60"

12. Brian Bulfer, Detail of *Wheat, Rice and Corn Production in China 1953-2006*



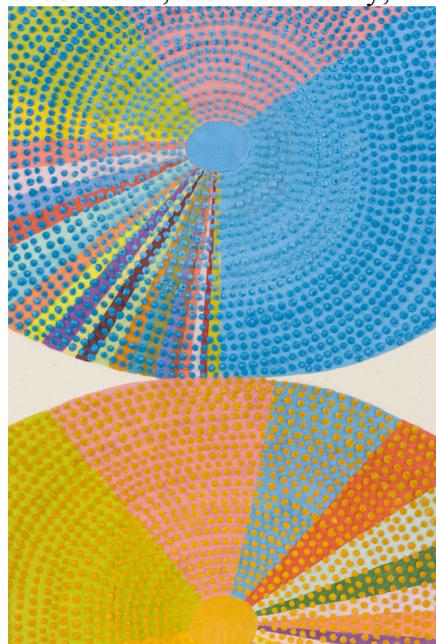
[fig. 12] Bulfer, Brian. (Detail of *Wheat, Rice and Corn Production in China 1953-2006*)

13. Brian Bulfer, *Labor Force, Stock of Money, Purchasing Power and Surplus*



[fig. 13] Bulfer, Brian. 2009  
*Labor Force, Stock of Money, Purchasing Power and Surplus*  
 Oil on canvas, 41"x35"

14. Brian Bulfer, Detail of *Labor Force, Stock of Money, Purchasing Power and Surplus*



[fig. 14] Bulfer, Brian. (Detail of *Labor Force, Stock of Money, Purchasing Power and Surplus*)

15. Brian Bulfer, *Land Size, ...*

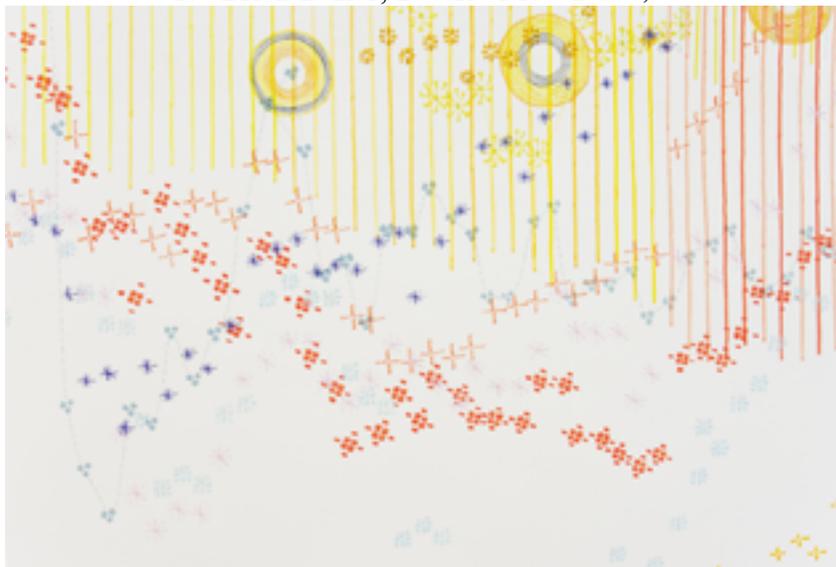
[fig. 15] Bulfer, Brian. 2009

*Land Size, Population, Military Expenditures, Labor Force, Export, Education  
Expenditures, Internet Users and CO2  
Oil on canvas 8'x6'*

16. Brian Bulfer, Detail of *Land Size, ...*[fig. 16] Bulfer, Brian. (Detail of *Land Size, Population, Military Expenditures, Labor Force, Export, Education Expenditures, Internet Users and CO2*)17. Brian Bulfer, Detail 2 of *Land Size, ...*[fig. 17] Bulfer, Brian. (Detail 2 of *Land Size, Population, Military Expenditures, Labor Force, Export, Education Expenditures, Internet Users and CO2*)

18. Brian Bulfer, Detail of *The Nasdaq,...*

[fig. 18] Bulfer, Brian. (Detail of *The Nasdaq, the S&P and US Oil Companies 2008*)  
Gouache on paper, 7'x5'

19. Brian Bulfer, Detail of *The DOW,...*

[fig. 19] Bulfer, Brian. (Detail of *The DOW, European Currency and US Oil Companies 2008*)  
Gouache on paper, 7'x5'

20. Brian Bulfer, (*Indian's Expenditures of Food*)



[fig.20] Bulfer, Brian. 2010 *Composition of Rural/Abject Impoverished Indian's Expenditures on Food by Household Types (Crops and Food Necessities, Dairy, Meat, Sugar, Oilseeds, Fruits/Vegetables and Grains).*

The garland is patterned after delta EEG wave cycles.

Cast Soy Wax