PIIMPAPER05

MODELS FOR DESIGNING WITH INFORMATION:
COGNIZANCE & AESTHETIC OSCILLATION

WILLIAM BEVINGTON, PIIM, THE NEW SCHOOL

GENERAL INTRODUCTION: PIIM is the Parsons Institute for Information Mapping. PIIM is a one-of-a kind university research and real-world development facility within the New School — a global university. One of PIIM's initiatives is to disseminate design theory and modeling methods with the aim of building better knowledge tools. We develop or derive these practices from a wide host of design disciplines and principles. (Please see below for a full list of the design practices considered.)

PIIM's ultimate goal is to create and disseminate procedures that allow users to derive insight and understanding from the data and information associated with a wide range of disciplines. Of special interest is deriving knowledge from massive, incomplete, or composite information sets, particularly that kind information that is amalgamated from multiple fields and/or sources. We support the general dissemination of good information design practice; therefore, content from this document may be used in other publications provided the source is cited as described. (Please see the *endnotes* of this paper for details on copyright and subsequent usage of text from this document.)

When creating knowledge tools, be they single documents or significant interactive undertakings, our aim is to build a framework of "informative context" derived from all available data. Despite the overwhelming percentage of technical processing to achieve this — and the subsumed information technology that permits such realization — the final transference to human insight occurs at the æsthetic level. Therefore, if an effective visual context is constructed, the user can "see" patterns of knowledge and make predictions. From these informative patterns, inferences concerning information that one previously had not ascertained becomes possible. This permits "knowledge surfacing," whereby useful intelligence becomes apparent through an effective visual interface. Each PIIM PAPER in this series endeavors to support our mission through specific examples of theory, practice. or generalist concepts.

The following is a list of disciplines from which PIIM derives theory and process: advertising design, æsthetics, animation, architecture, branding, communication design, engineering, environmental design, exhibition design, game theory, graphic design, GIS [Geographic Information Systems], human factors, illustration, information architecture, interaction, interface design, knowledge management, network theory, pattern recognition, pictography, process design, semiotics, strategy, symbol design, systems design, transportation design, typography, universality, and usability paradigms.

CONTENT

REPRESENTATION

RENDERING TOOLSET
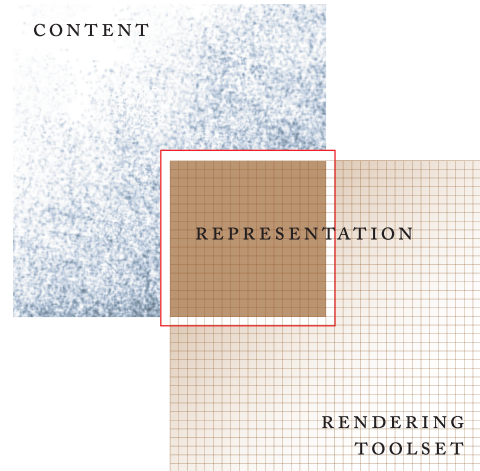
In the elemental and instrinsic sense, information cannot be seen — it needs to be made visible through a natural or creative artifice. Information only takes on a tangible form when rendered through a toolset — the toolset provides the "aesthetic drapery" for the content.

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TOPICAL INTRODUCTION: The process of designing involves the conscious intention to create. This includes all aspects of communicating. Graphic design specifically involves the process of rendering tangible representations of things or ideas. Further, information design involves the creation of visually structured representations (utilizing consistent logic as to how content and other factors of the source are to be represented). The discipline of information mapping raises the ante somewhat, requiring that the representation be logically contiguous in its visual, spatial, or temporally visible patterning. This permits the user to predict or plan from seeing information in extended context. The relationship of a representation to its source can be realistically self-evident, or very highly abstracted (relative to the sophistication of the "knowledge worker" who must act upon or analyze the information as it is visualized).

The results of successful design efforts often appear visually self-evident. Yet the effort to get them to appear this way is often considerable. The goal of quality information design is largely concerned with "discovering" such simplicity through hours of research, consideration, visual model making, and refinement.

Through the collective efforts of evolved design practice, as well as pockets of singular insightfulness, there is a softly defined canon of approach. Examples of such consistently applied methods can be found in areas of readability of typography, effectiveness of color displays, figure & ground relationships, etc.

Sometimes formal theories, promising consistent outcomes, understandings, classifications, or methodical approaches, are suggested. (An in-depth example of such a theory is presented in PIIM PAPER 01 of this series.) Othertimes, far more experimental, temporal, or "departure-point" concepts are offered. We call these somewhat less rational design tools "models." Unlike mathematical theorems, or strict rules of grammar, these models are only intended as kinds of design stepping-stones. If they are in the right location to advance one's journey then they may be of use, if not they may be squirreled away for future use, or ignored!

The text that follows presents such an information design model. It is constructed of both scientific and artistic language. The purpose of this type of discourse is simply to allow designers (and users of designed products) to think about new angles of approach. The model in this paper deals with the concept of pre-sensory and post-sensory perception. In addition are ideas about the interchange between unseen information and the aesthetic of the seen; "aesthetic oscillation". At times the discourse is a bit fanciful, but the objective is to find kernels of useful design methods in the ever-advancing goal of improving the task of turning the unseen, the noisy, and the chaotic into knowledge.
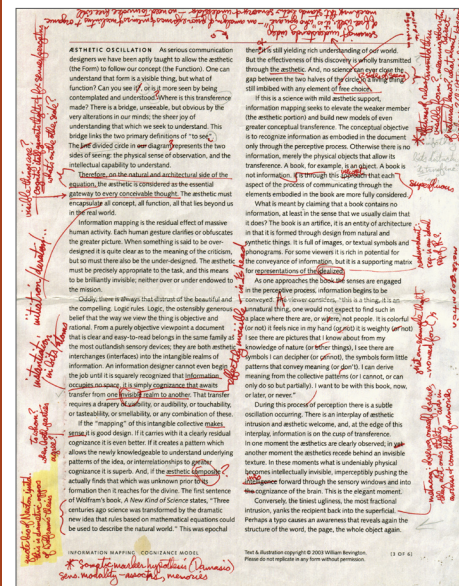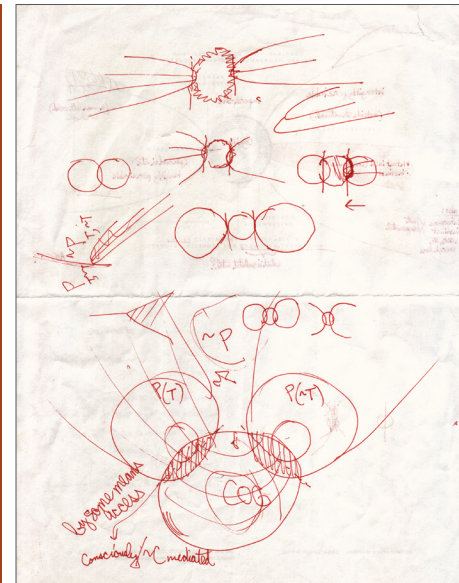
The process of designing is a process of continual refinement. A challenge is that "rightness" is a function of perception — both the designer's perception and the recipient's perception. The document illustrated above is an example of this process (showing annotations by Dr. Arno Klein).

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CONCEPTUAL REALISM AND CONCEPTUAL IDEALISM:

A realist might argue that each of us dwell inside a six-sided prison; each side being determined by the limitations of our psychophysical senses. Conversely, an idealist might counterclaim that we luxuriate within a sensory mansion, a mansion with a limitless floor plan.

Prison walls are intended to keep things in, while mansion walls primarily keep things out, yet both provide spatial separation. In buildings, these walls require openings through which things may pass. These ingresses and egresses are the windows and doors. In living things the physiological and psychological senses function as the transmission points.

Through our senses we are endowed with the capability of perceiving and distinguishing what lies outside ourselves. This results in the cognizance of that which was transmitted through our senses. The external becomes internal cognizance. Does this newly perceived thing make sense, is it part of a system of thought we already accept? Does it strengthen a pre-existing pattern of thought, or weaken it, or does it belong to no pattern at all? Is it welcome, or rather uncomfortable to contemplate?

Despite a tendency to be "open-minded" or "close-minded," we assign a value to what we know and we employ an over-arching faith in what we consider to be true or untrue. These values are very much based on how we equate the trustworthiness of our completed perceptions. Most resultant cognizance is merely a blending of realist and idealist notions — few individuals can be classified as purely realist or idealist in their perceptions. Most consider that which is around them as the real world, and most would claim that they ultimately possess the realistic outlook.

The realist employs perception to better understand the external, but that external is considered the real-real world. The cycle is more objective. The language of science may better communicate to these tendencies of our realist nature, while the language of art appears to communicate to our idealist inclinations.

The most useful rendering must actually be a blending of real and the ideal cognition, a cocktail of concepts derived from the collective sensory input; resulting in a moderately logical understanding. The communicator takes most of this for granted, rarely considering that their recipient may have inclinations to one extreme or the other. (Acceptable, as most probably won't.) Yet, there is value in considering the potential of what these extremes could render respecting the kind of information that one must ultimately transfer through sensory means. Indeed, if designer and user agree to investigate the extremes, higher levels of cognition may be achieved. In conclusion, when humans are a necessary a link in the chain of perception, then ideality and reality should be considered in the process of what we may be called the æsthetic draping of information.
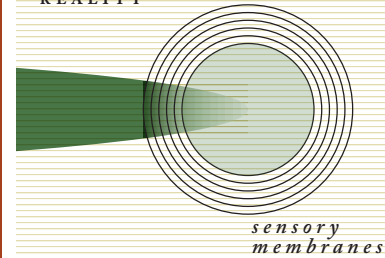

PROCLIVITY TO THE EXTERNAL: REALITY

sensory membranes

PROCLIVITY TO THE INTERNAL: IDEALITY

sensory membranes
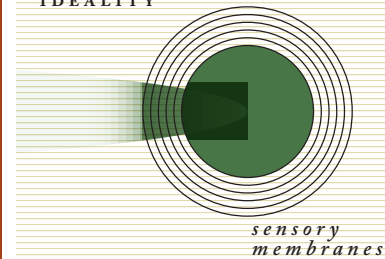
BALANCED BIAS: IDEALITY/REALITY

sensory membranes
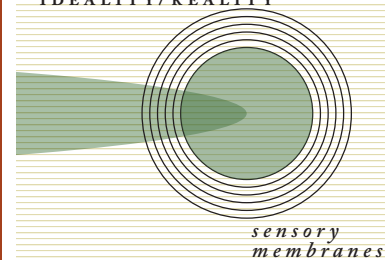
The idealist looks to the outside as a source of information yielding the only assuredly real thing — the resulting thoughts occupying their mind. The idealist employs personal perception to build an internal reality, or not, from external stimuli, and generally assigns subjective values to these stimuli.

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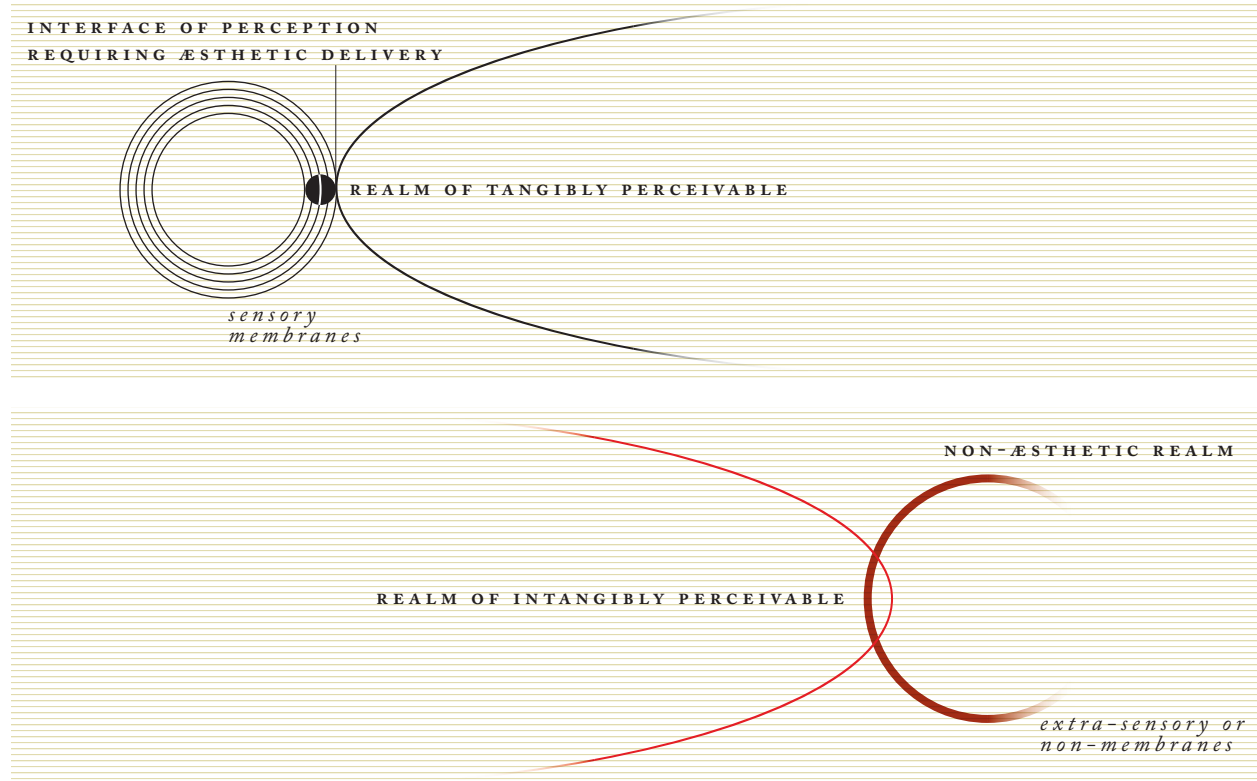## MODELS FOR DESIGNING WITH INFORMATION: COGNIZANCE & AESTHETIC OSCILLATION

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INTERFACE OF PERCEPTION
REQUIRING ÆSTHETIC DELIVERY

REALM OF TANGIBLY PERCEIVABLE

sensory membranes

NON-ÆSTHETIC REALM

REALM OF INTANGIBLY PERCEIVABLE

extra-sensory or non-membranes

NUMBERING THE SENSES: Within the framework of the ideal and real designers may consider how the transition occurs from available stimuli to cognizance. How does each sense contribute to tangibility? The senses are more than mere filters, they are active participants toward the penultimate perception.

The ability to perceive: light waves, sound waves, the particles in the air we breath, the environment next to our skin, as well as our sixth sense of equilibrium — these are the six walls of that six-sided prison. It may, at times, be a gloriously pleasurable prison, but the walls are there none-the-less.

Consider that the seventh sense, a kind of "wall-less" wall, is a recognition of a perception beyond these. Sometimes a mere toy of paranormal entertainment, often a deeply faith-held paradigm; scientifically defined as a "latency," this sense represents the facility (existent or not so) of communicating directly with realms of cognition without recognized, observable, or testable methods (that is, without any existent stimuli). Ages, realms,

and cultural norms have been built on the ability to employ this sense, or follow someone who has. For some it makes their cognitive mansion into a very ideal place; for others it makes their collective perceptions a rather uncomfortable place. In the simplest terms we can address this potential cognitive factoring as simply latent intelligence; something genetic — something within. For communicators it is something not so easy to create *as to find unexpectedly in the outcome of successfully designed forms and symbols*. This "sense" may simply be nothing but errors in thought processing still to be shaken off by our descendents, or it may be the workings of superior metacognition yet to be developed to improve our reasoning capacities. It is also possible that this was once a very perfected capability, now atrophied.

From the perspective of generating outcome-oriented communications it is not necessary to confirm or deny such a seventh sense. Self-imposed objectivity informs the most effective undertakings in information design.

INSIDE AND OUTSIDE THE "SENSORY RINGS": Consider the distinction between that which is currently perceived and internally assimilated, and all that yet lays "outside our skin" (a significant information set!).

Again, the idealist sees the real as being on the inside of the sensory "rings" and the realist regards the truly real as all that that is yet-to-see. So the idealization of what is real (outside) for most persons is reversed for the absolute idealist, who transfers all the unreliable external to the real and internal. There is as much rationale behind the realist's argument for the existence of the supernatural or metaphysical as the idealist's arguments against it. (Though typically these arguments are reversed.) Analysts on both sides of the information equation tend to slowly objectify the process of developing tangible communications or acting upon the tangibly communicated. As this process continually weeds out the subjective, acts of apparently irrational behavior (from simple economic decisions to horrific acts of violence) proliferate. The extremes of sensory perception as interpreted by the equal extremes of the real and the ideal may account for the "unaccountable."

point of oscillation / the observervable

INTERNALLY PERCEIVED [UNSHARED]   EXTERNALLY PERCEIVED [SHARED]

observed / point of oscillation
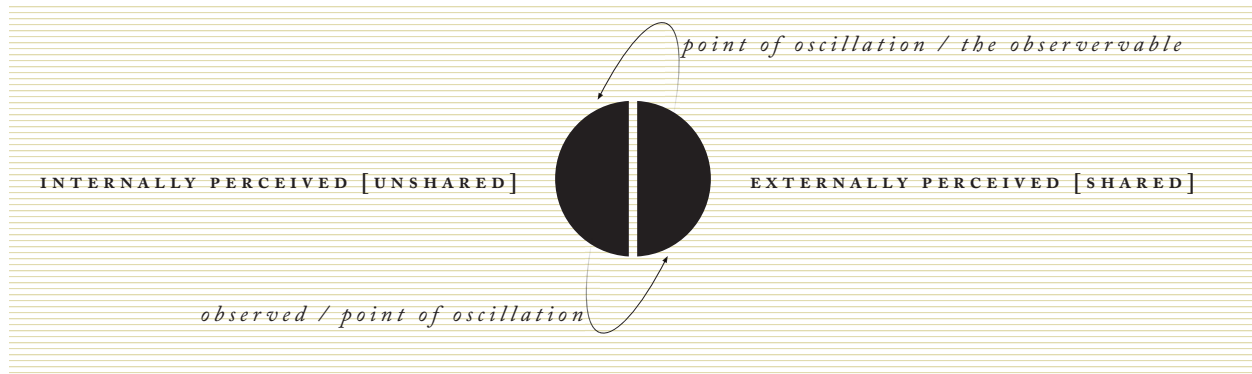
ÆSTHETIC OSCILLATION: Philosophies of modernism taught designers that æsthetic (form) should necessarily follow purpose and concept (function). Understandably, form is a visible thing, but what of function? Can you see it, or is it to be seen through an inductive or deductive process? Where is this transference between the outwardly seen, and the inwardly known, made? There is a bridge, and this bridge links the two primary definitions of "to see". The line divided circle in our diagram represents the two sides of seeing: the physical sense of observation, and the intellectual capability to understand. Therefore, on the natural and architectural side of the equation, the æsthetic is considered as the essential gateway to every conceivable thought. The æsthetic must encapsulate all concepts, all function, all that lies beyond us in the real world. Each act of communication creates and aesthetic — the world demonstrates the asthetic residue that is the result of these efforts. Each human gesture clarifies or obfuscates the greater picture. When something is said to be over-designed it is quite clear as to the meaning of the criticism, but so must there also be the under-designed. Ideally, the æsthetic must be precisely appropriate to the task, and this means to be brilliantly invisible, neither over-, nor under-endowed to the mission. Oddly, there seems to be a widespread undercurrent of distrust concerning the beautiful and the compelling (from ubiquitous dumb-blonde jokes to Bang & Olufsen audio componentry). Logic rules. Logic, that ostensibly generous belief that the way we view the thing is the norm, the objective and rational.

From the initial perspective of our sensory devices, simple, clear, easy-to-read text is in the same visible family as the most exclusionary professional textual discourse. Both are sets of symbols that must pass by æsthetic interchange from the intangible to the tangible. The information behind the text occupies no physical space. Information is simply cognizance that awaits transfer from one invisible realm to another. That transfer requires a drapery of visibility, or audibility, or touchability, or tasteableness, or smellableness, or any combination of these.

This is what is meant by an æsthetic interchange. For the seen to become known, the seen must first be all-important, and then, fundamentally unimportant.

The very transfer point is a milieu of instantiation of bits and atoms leaving a new, useful, yet still invisible reality in the mind. This is a compelling argument for why things should be designed with the utmost care on the æsthetic level — for once the transfer is made, the resultant piece of informative architecture occupies our built world even though we may never partake of its functionality. Again, a library is generally beautiful by this very reason (scores of books we see but will never read), and conversely, so many cities are ugly because we never enter the majority of buildings but partake of their often poorly designed or modified collective facades.

If the resultant internal "mapping" of this intangible collective makes sense (i.e., is readable and conveys the intended message, etc.) it is good design. If it carries with it a clearly residual cognizance it is even better. If it creates a pattern which allows the newly knowledgeable to understand underlying patterns of the idea, or interrelationships to greater cognizance it is superb. If the æsthetic-composite reveals that which was fully unknown prior, it reaches for the divine. The first sentence of Wolfram's book, *A New Kind of Science* states, "Three centuries ago science was transformed by the dramatic new idea that rules based on mathematical equations could be used to describe the natural world." This statement turns Newton's assertion on its head, where nature's perfect mathematics is merely to be uncovered through scientific investigation. Both ideas define the difference between natural information and information artifice. One sees natural information revealed through the periodic table of elements or through Cladistic Taxonomy (modeling derived from the Linneaen Taxonomy) used by evolutionary biologists. For natural information scientific investigation is the primary factor in closing information gaps; for information artifice science may play its role, but professional consensus is the stronger formulating agent.

Information design tends to reveal æsthetics as a support to science or social policy. It is also as an æsthetic support to any area of serious study. Whether science or study, the information that is intended to be communicated, or better, found-out through the communicative process, is "disembodied" through the perceptive process. Otherwise there is no received information, merely the physical objects that allow its

transference. The book, unread, is a mere object that contains no information sans the perceiver.

Consider that the book itself does not really contain the information. The information is not there. Instead it is an entity of architecture formed through artifice of natural and synthetic things. It may be full of images, or textual symbols and phonograms. For some viewers it is rich in potential for the conveyance of information, but it is merely a supporting matrix for representations of the idealized.

As one approaches the book the senses are engaged in the perceptive process, information begins to be conveyed. A viewer considers, "this is a thing, it is an unnatural thing, one would not expect to find such in a place where there are, or where, not people. It is colorful (or not) it feels nice in my hand, it is weighty, I see there are pictures that I know about from my knowledge of nature, I see there are symbols and patterns that I can understand, etc."

During this process of perception there is a subtle oscillation of æsthetic intrusion and æsthetic welcome, and, at the edge of this interplay, information is on the cusp of transference. In one moment the æsthetics are clearly observed; in yet another moment the æsthetics recede behind an invisible drapery. In these moments what is undeniably physical becomes intellectually invisible, imperceptibly pushing information forward through the sensory windows and into cognizance of the brain.

This is the elegant moment.

Conversely, the tiniest ugliness, the most fractional intrusion, yanks the recipient back into the superficial. Perhaps a typo causes an awareness that reveals again the structure of the word, the page, and then the whole object thus cascades back to a book in hand ("who proofread this?"). The artifice has oscillated back into view and the fabric of information transfer is torn. But in a moment the viewer settles, forgives the error, the typography again fades imperceptibly and shapes again convey ideas, the invisible yields its rich stream of the unseen.

Each viewer brings a unique case-by-case tolerance for splitting this division between the observed and the transferred. This tolerance is based on an ever-altering set of conditions, a vast and complex awareness into which the unimpeded information is intended to flow.

COGNIZANCE (X) TRANSMITTED FROM
SENSORY MEMBRANES REQUIRING ÆSTHETICS

ÆSTHETIC
INTERCHANGE

ARCHITECTURAL
REALM

SUPERNATURAL REALM

SUPER-ARCHITECTURAL REALM

NATURAL REALM

EXTENT OF
PERCEPTION

NON-ÆSTHETIC
INTERCHANGE

DURATION OF PERCEPTION

COGNIZANCE (X) TRANSMITTED FROM
EXTRA-SENSORY MEMBRANE NOT REQUIRING ÆSTHETICS
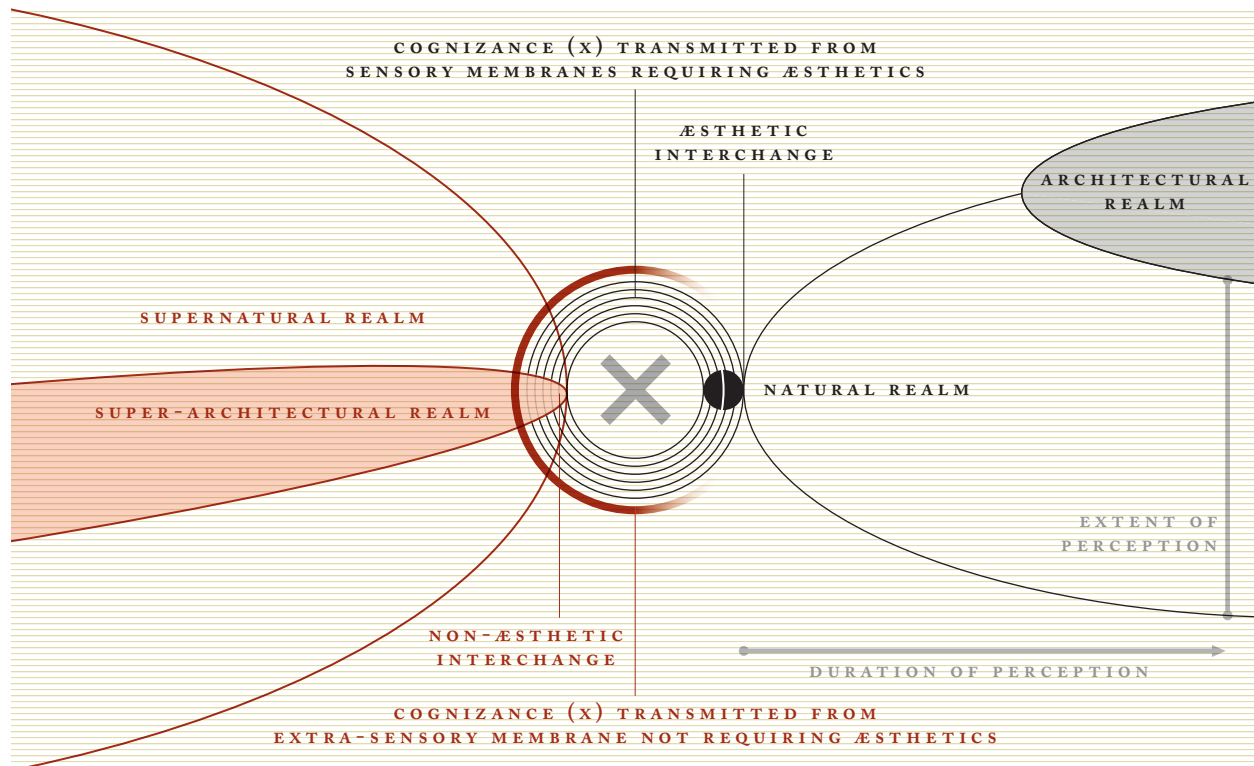
THE COGNITION MODEL: At the center of the illustration stands a cross or positive sign. It represents cognition or "that which comes to be known", from the Latin, cognitus. Allow the process of transferring intelligence to be simplified into three cycles: perception, cognition, and action. Cognition in this model is viewed as the epicenter of intellectual growth, embodying the fullness of awareness and knowing. The sign also signifies that this cognizance, having been transferred via æsthetic representation is locked-in; finally, it also indicates that knowledge is generally additive.

The six-ringed circle represents the faculty of sense perception. The classical five are indicated: sight, smell, and hearing (the distance receptors), taste and touch (the contact receptors). Proprioception, i.e., the sense of equilibrium forms the sixth ring.

A seventh ring is added which fades as it reaches the vertical axis of the circle. It represents the (classically) "sixth sense," or the spiritual sense, or the keenly intuitive sense. It is drawn incomplete because where the other senses are the most acute this sense is purportedly weakest. The reverse could also be true, that this sense augments the tangibly driven senses

when they are at weakest status. This sense is the conduit to the invisible or that which exists outside of the natural realms. Its very existence is of course debated. At the very least, one could consider this sense to be an emotive enveloping capability, much as the classical idea of the quintessence joins all the four lower elements. This concept is formalized in Antonio Damasio's *Somatic-Marker Hypothesis,* whereby, in times of informative and cognitive overload, decision-making is rendered (quite capably) through a purely emotional process.

The right elliptic just tangent to the senses (touching the small, solid, split circle) represents that which may be perceived. Intruding into this elliptic is another realm labeled architecture. (The term architecture refers to the entire built world, including any area of nature significantly modified through human design or intervention.)

Note that the architectural elliptic also generates some new space while obliterating some natural space (decreasing the quantity and subsequent perceptibility within the natural regions).

The elliptics have two axes: the "y" (minor) axis representing the volume or sheer quantity of that

which is tangible; and the "x" (major) axis representing awareness through exposure across an available time frame. So: one could perceive significant quantities over a short time, or perceive minute quantities over a long period. (Clearly, there are many other reductions and amplifications to these fields of pyschoactivity.)

The elliptic on the left side of the diagram, representing the supernatural and the "super-architectural" are cause for great speculation. This is because these realms are not typically perceivable through the common senses.

The concept of supernatural is defined for our model as that which is above, or outside of, the natural. This realm yields a cognizance acquired without an æsthetic interface; this is why it is shown to be directly connected, or passing through the traditional senses. Inspiration is an adequate word to describe this kind of transference if such an assertion is not too controversial.

The concept of the super-architectural is new in terminology but has several philosophical roots. It refers to the notion of latent intelligence based on human history. This history can be mythological, artistic, cultural, scientific, etc. The critical point is it refers to cognizance that is not acquired through any perceptible or behavioral means. Jungian psychologists would refer to it as the collective unconscious. It deals with the instinctual, and is directly opposed to ideas of total behavioristic viewpoints. It is difficult to decipher the origins of super-architectural sources, as much similarly resulting cognizance may readily be acquired by apparently æsthetic means, yet masquerade as being drawn from a kind of subconscious information stream.

Cognizance from these left-sided elliptic is also obtainable through inference of the natural (and architectural) realms; instinctively through inborn intelligence; from those who have direct contact (prophets, seers, mediums); and from sacred documents. But all these methods are hybridizations with the right side of the illustration, i.e., from the architectural and natural realms, and therefore increasingly reliant upon æsthetics.

The split circle, which links the tangibly perceivable to actual cognizance, is the smallest component of the illustration. Yet, it is the most critical from the perspective of information mapping. The presence of this element represents the undeniable need to recognize that nothing from the natural and architectural realms can be initially known without æsthetics. The split, or missing area, is the point of interchange where the seen (or heard, or felt, etc.) becomes cognizant. It has three parts: the right half-circle touches the æsthetic of that which is to be perceived, which is a physical composite of some kind; a point of interchange where the physical oscillates over to the left half of the element; the perceived thing, which is now rendered as information. (The centerline is a part, a non-part, and absence of either the right or left side.)

This oscillation back and forth between the image or representation of the real, the very germ of perceptive transference, and the very origin of cognizance is an entire study unto itself. For our purpose the concept of the fragile and fleeting nature of this thin divide is all-important.

From the information tool maker's perspective the diagram hinges on the role represented by the split circle. Æsthetics are both entirely critical, yet fully subjugated to that which needs to be conveyed. One is often confronted with the argument that design is intrusive to the pure transmission of an idea. Perhaps designers fail so often in their task that the design process itself is suspect. Yet, only excellence in æsthetic configuration can effectively represent a concept and then "hand-off" the cognizance of that concept without compromise (or through a conceptual invisibility). Generally, it is thought that the less the design intrusion the better, but the highest standards in information transfer require tremendous intrusion. The intrusion needs to be subsumed into a masterly composition, at once articulate and effective. It is a silence created by the balancing of an awesome level of interacting sound waves, rather than the silence afforded by the absence of any sound waves altogether. For those caught up in the sheer presence of the æsthetic or the joy of sights and sounds, the designers task may appear to be easier. But in the highest echelons of intensive information transfer there are few candidates swayed by the sensual. Efficiency, clarity, accuracy, and expediency rule—very aware that poorly conceived æsthetics can weaken their resolve—but usually unaware that æsthetics can significantly elevate their cause.

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ENDNOTES: We sincerely hope that this PIIMPAPER has been of benefit to the reader. Our purpose in making these papers available is to stimulate interest in the craft of information design, and to promote the creation of the highest level of insight into informative sources. Good communication empowers all concerned. A lack of informative transparency can undermine a mission. It does so because the stakeholders are unaware of better information design opportunities. Thankfully, when one sees how the same information can be arranged so well, or so poorly, there is never a return to less revealing information constructs.

In a manner, the very process of interacting with information causes more and more information to be generated. This is why practitioners must think with non-linear methods and cast a net of containment over the whole, by doing so they may ascertain patterns that permit reduction. There is a joy in working with creative individuals while they collectively struggle to reveal just what kind of logical key can generate info-insightfulness. That is what these models are; however, though they have been formalized to withstand just a bit more criticism then one may find from one's supportive peers in a late-night session!

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