

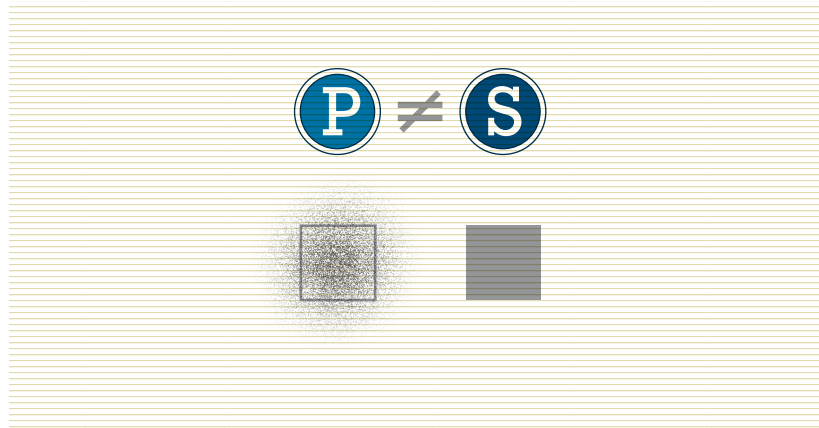
A SOLUTION TO EVERY PROBLEM?

A supposition that pervades much of our educational and professional environment is the belief that every problem can be isolated and solved. This thinking process compels us to “solve the thing” and move onto evermore challenging problems. If this problem / solution approach were only to be found in our most logic-based undertakings, it might be justified; but the same formula has permeated much of our abstract thinking processes as well.

At first this simple formula produces the desired outcome. Soon problems with greater levels of risk are undertaken and rewardingly dispatched. This

conditioning leads to an ever-increasing reliance on this dualistic formula. Experience appears to broaden the apparent skill, but the applied technique tends to narrow. The problem solver becomes addicted to the formula.

The entire creative process is continually downgraded in favor of observable outcomes. This makes the whole procedure of design and project management less rewarding, less inventive, and ultimately, less effective. Then, in a subtle or sudden manner, the gremlins that are ignored by this roughshod problem / solution practice emerge and multiply.



A straight line from problem to resolution is what is usually hoped for, but rarely obtained. As the upper diagram illustrates, one cannot merely cancel out the problem through an antidotal formula.

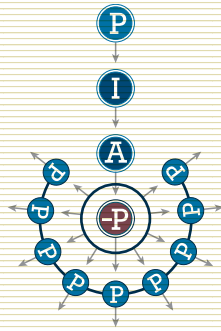
Whatever we do not encompass as part of our initial analysis will find its way past the solution into residual problems. The lower diagram depicts the notion that every design process can only encompass so much noise—outside our perceptions there is always more.

PROBLEMATIC ESCAPEES By peering down the vast cone of time, we can imagine unyielding skirmishes in the problem solving battle. We see poorly identified problems being sequentially attacked by the most capably equipped soldiers. What has been accomplished through the methods used, and what has become of this expanding universe of people formulating methods to resolve problems?

It would seem inevitable, that long ago, formulas derived from all this problem solving would have eradicated humanity’s major miseries. We should by now be tweaking the daily challenges and building an environ-

ment of social and aesthetic grandeur. Perhaps not resulting in a utopia, or a universe of continual ease and joy, but surely a less tormented and diminished world.

Advancing technologies and new (or increased) resources are always a welcome salvation from what in hindsight seemed inadequate. However, these increased capabilities are generally coupled with unforeseen complexities. It is rarely the evils of the inherent “advancement” but a misunderstanding of the side affects of our activities that result in lost opportunities.



Every problem must be resolved through a sequence of gathering information, interpreting the information, and committing an action in response to the interpretation. Despite the attempt to thoroughly resolve a problem, subsets of new problems are often generated. The sequence continues indefinitely. Each of the sub-problems will require its own investment of research, interpretation, and applied action.

INCOMPLETE CLASSIFICATIONS One great drawback of formulaic methods is their tendency to encourage the problem solver into streamlining the entire challenge into manageable categories and known classifications. By trying to render all the “apples and oranges” into one or the other, crucial peripheral issues are overlooked or consciously disregarded. The haste to render the creative process into a problem / solution formula masks or deletes the complex subtleties that lend depth and beauty to the things we make or reform.

Each unidentified element possesses its own language, a language yet to be learned. In a parallel way, every action produces its own tiny terminology

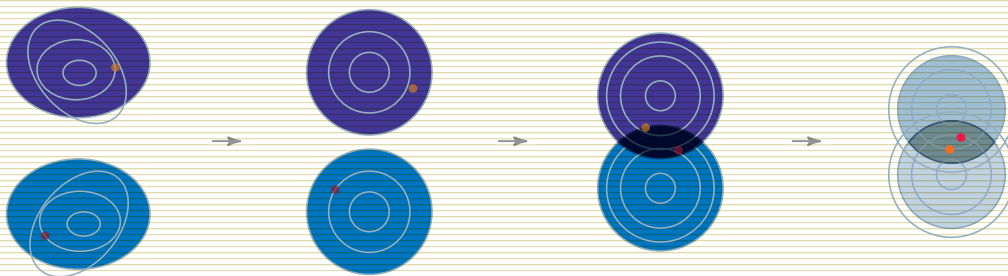
and fleeting dialect. Concentrating on the specificity of the problem limits our perception of these combined vocabularies. We may address the “identified” problem, but are unlikely to consider many potential sub- problems. These potential sub-problems unnoticed or ignored during the planning stage yield a plethora of “opposite outcomes.” We may suppose that these details shall resolve themselves. Instead, they spring up and choke their progenitors. Sometimes a substantial time period is required to recognize these sub-problems. Frequently they skip a generation or two.

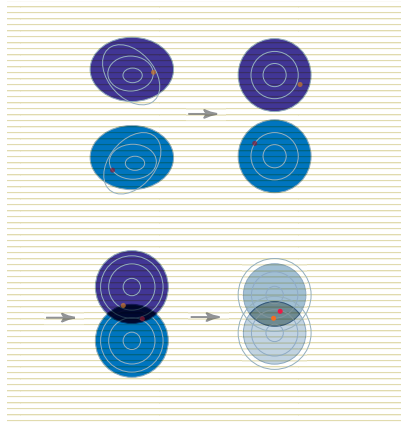
BY DIVIDING WE ARE CONQUERED By narrowly categorizing the task during the early stages of the design process we ultimately allow most micro problems to transmute into macro problems. These evolving problems are more tenacious, tending to permeate across many natural and man-made systems. This is because the challenge lies in regions outside of our classifiable grasp. The problems, having no self-awareness, are unencumbered with the knowledge of their categories!

The undefined problem migrates to a nether world where it becomes part of several other problem types

or sets. Since we usually define a challenge through a specialist area, it is no wonder that it does not properly respond to a specialist approach. A new or modified language would be required to understand it.

Roadblocks emerge which allow the subproblems to remain masked. An increased dosage of an already ineffective procedure cannot offset these problem subsets. We cannot simply move more quickly down a familiar path, or continually attempt to subdivide the problem. All of these procedures will merely mask problem sets or generate greater noise around the problem’s core.





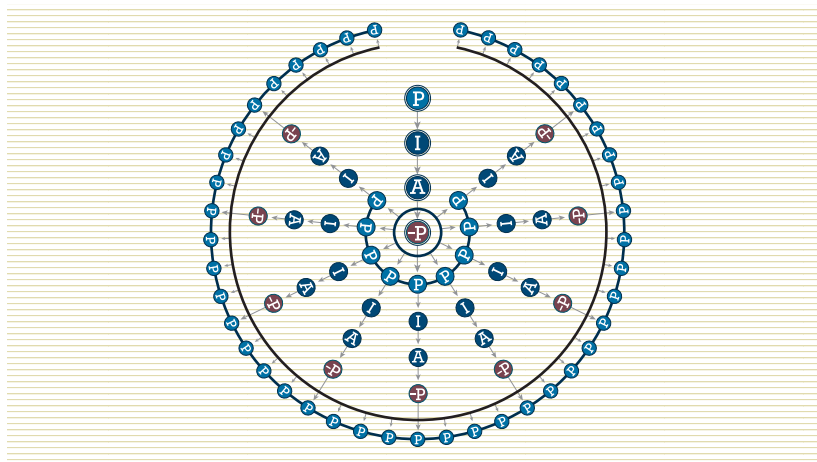
It is a logical tendency to place a problem within a category and apply the language of the very same category towards its solution. The nature of a problem, however, is that it always possesses some obscure element. (This is how it originally became a problem). It should be our objective to reveal and become attuned to this more obscure quality. It is not effective to place it into our system, but to adapt our system to it. Ideally one should work within only a single all-encompassing category.

This would be a kind of borderless megasystem. If instead, we apply contained systems, the problem will have elements which float beyond our reach. These elements become the seeds for future problems.

Sometimes these unresolved elements blend with offshoots of other unrecognized elements to form a troublesome cocktail that will be exceedingly difficult to defuse in the future. This condition is simulated by these models.

A PROBLEM AND ITS PROGENY Having defined the problem, poorly, we then turn to set methods and formulas to save ostensibly unnecessary thinking. We are less than desirous to replicate a supposedly resolved thinking process. Our goal is to minimize the thinking part. This is expedient but it is the second mistake and further weakens our unstable foundation of poor classification. Upon this poorly cast foundation a third process ensues — taking the initial action. From here we usually observe the results, survey the damage, and begin anew.

The argument against this sequence is manifest, but one primary concern is that by the time the problem is isolated, and braced to be solved, it has probably altered. Conditions through time modify the identified problem, weakening the effectiveness of the action. The analysis, so acutely targeted to the perceived problem, seems oblivious to perceptively smaller, but potentially larger, co-problems. The difficulty lies chiefly in the planning part; is it interpretative or merely aimed at subtracting the problem? How thoroughly have potential sub-problems been envisioned?



This diagram illustrates the core premise of the entire argument. Each action generates the potential for sub-problems. The action is usually considered the essential activity to resolve problems, but its leverage can be equally effective in production or destruction of information.

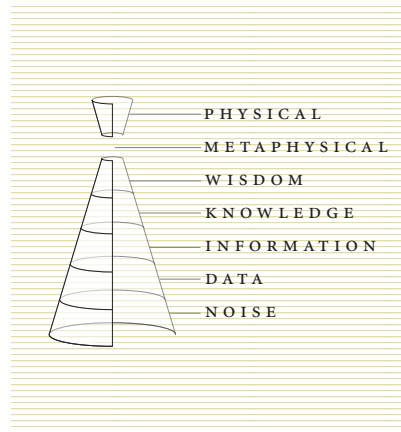
This calls for greater emphasis on the process of planning and envisioning possible outcomes in lieu of action. The ideal being to render the maximum amount of energy prior to physical interaction.

STANDARD PROCEDURES PROVIDE COSTLY COMFORT Since continual rethinking is complex, it follows that most problem solving is attempted with the concrete tools of procedures and policies. Problems are identified within the context of known procedures and ostensibly resolved through the same context. Of course, the truly fascinating problems occur because this systematic approach has already failed. This is why interpretation is not so easy; every specifically successful

approach must leave the predetermined path. (Perhaps not at the outset, but always, someplace.) A carefully considered combination of fixed and fluid interpretation must occur at each stage, from the recognition to the final action taken. The process of design should build all our information and interpretation into increasingly useful and comprehensible forms. Our concern must be with the entire process, even the elusive fringes. Since no significant problem is totally resolved there

will always be residual elements swirling about the center stage. The designer must perform with the least intrusion upon this stage. The performance determines

what will be resolved and what will remain.



The raw material of information is noise. The noise is unfocused, massy, and without purpose. It is however, rich in potential. The difficulty of working with this unfocused mass is that even to consider it generates additional noise.

Until the material is consciously compressed it has no identity or directive. Intelligent assembly of this noise builds informative things. If these things are well designed they can stand with complete independence of their creator.

Creative energy must be applied to concentrate the noise into data. From data, collected and concentrated information results. This process continues until one has a field of knowledge. Finally wisdom may result.

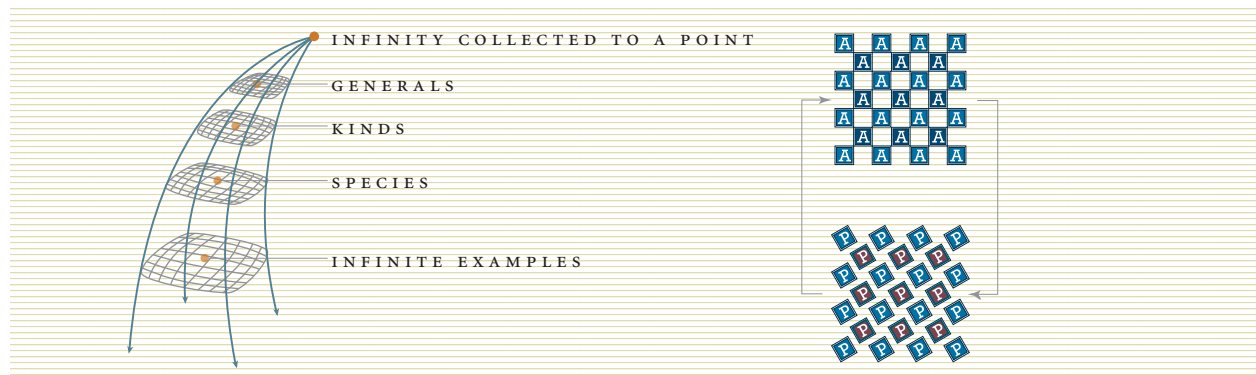
For our purpose wisdom is multiple fields of integrated knowledge coupled with altruistic motives. A fine information attribute indeed.

KNOWING AND INTERPRETING The design process fluctuates between “awareness knowledge” (cognizance and knowing) and “process knowledge” (interpretation and methods). Once the process of knowing is skewed to the interpretive stage, energy is shifted away from the initial cognizance.

A good designer continually juggles these two stages of knowing and interpreting—blending but not confusing one with the other. They cannot be simultaneous mental activities. Undamaged knowledge is usually effective toward the elimination of sub-problems. Interpretation is largely a factor of choice. Ill conceived, it sows the seeds for sub-problems. Selfish goals

often drive the interpretative process. From the visual perspective alone, it is interesting to note how dull, or even ugly, is much of the man made environment.

As much as can be, the interpretative stage must act altruistically upon the information chain. This chain is really a shaped infinitum, working its way from noise to data to information to knowledge to wisdom. It requires focused thinking to view its potential for building an environment that will not generate undesirable aftereffects. One must envision this process.



*In 1610 Francis Bacon wrote a series of essays in which he claimed that fables are a repository of accumulated knowledge. In the essay “Pan, or Nature” (part of *The Wisdom of the Ancients*) Bacon states, “Horns are given him, broad at the roots, but narrow and sharp at the top, because the nature*

of all things is pyramidal; for individuals are infinite, but being collected into a variety of species, they rise up into kinds... till at length nature may seem to be collected to a single point.”

He continues to suggest that this collected entity moves from, “abstract

ideas... to things divine; for there is a short and ready passage from metaphysics to natural theology.”

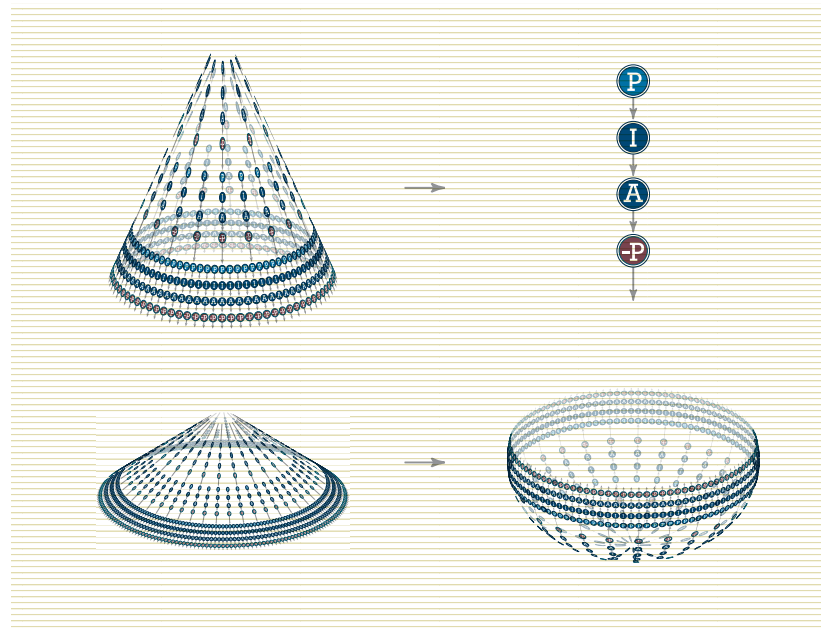
These diagrams demonstrate how items are connected and compressed, or disconnected and expanded, one from another.

VISUALIZING THE PROCESS Hypothetical diagrams can be devised for envisioning the possible extent of sub-problems and thereby minimize their occurrence. The diagrams can be pictured in several forms: needle-shaped, cone-shaped, or bowl-shaped.

The needle-shaped diagram represents the most desirable design construct, while the bowl-shaped diagram represents the least desirable construct. The extremes represented by needles and bowls are temporal conditions. They either resolve or hopelessly inflate the problem sets.

The cones represent all of a wide range of middle conditions. The cone-shaped diagrams allow time and activity to continually modify their shapes. Therefore, the coned examples are the most representative of common design and management activity.

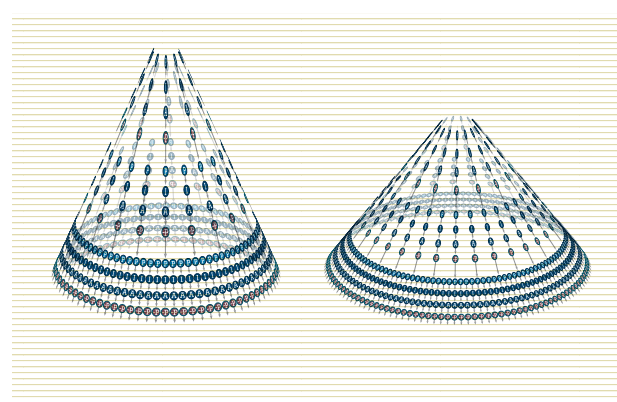
The more the cone narrows the more it represents a projected field of fewer sub-problems. On the other hand, the more the imagined cone shape widens the more the construct is tending toward disaster, since a wide cone represents a greater number of sub-problems.



The conical shapes represent the degree to which problem sets are controlled. A poor vision of the potential side effects of our actions yield wide cones, which can even flatten out and bowl upward. A good vision works in the opposite fashion, the cone is narrow. The cone shape can even become fine and needle like, which is tantamount to the ideal resolution.

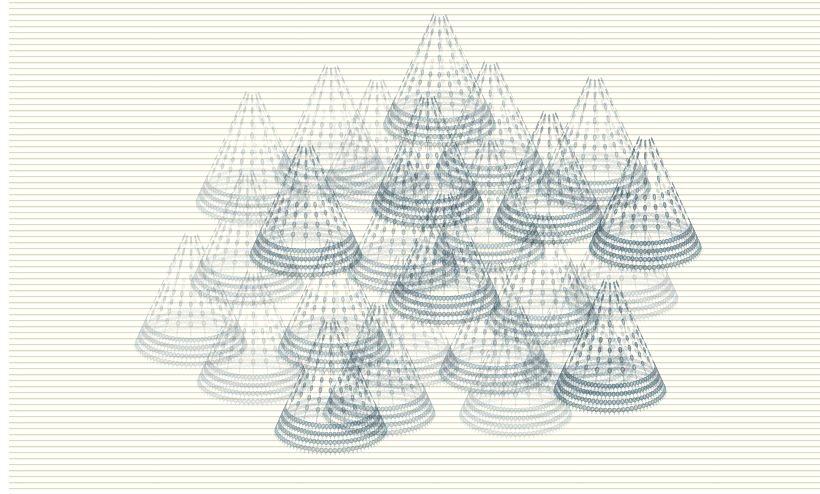
OUR PLACE IN THE CONES The diagrams indicate that we enter each challenge at the uppermost point. The reality is otherwise. We enter at some random, uncontrolled point within an endless construct. We simply become “part” of an unresolved construct that begins before our involvement, and if we are careless, continues long after our involvement ceases. Picture a galaxy of these cones; cones of every size and volume; cones within endless cones; each activity, each problem, and we—are bound within them.

The narrow cones are the most common models. These examples relate most closely to the results of our design and decision making activity. They represent a



cascading of ideas and actions constantly being interpreted prior to additional ideas and actions. Humans have become acclimated to the narrow cone model, since most problem solving actually permits (through things like cost-benefit analysis) a certain amount of residual “noise” as an acceptable by-product

of design choice and activity. Expediency and economic concerns rarely permit resolution planning beyond the first or second stage of foreseeable residual problems.



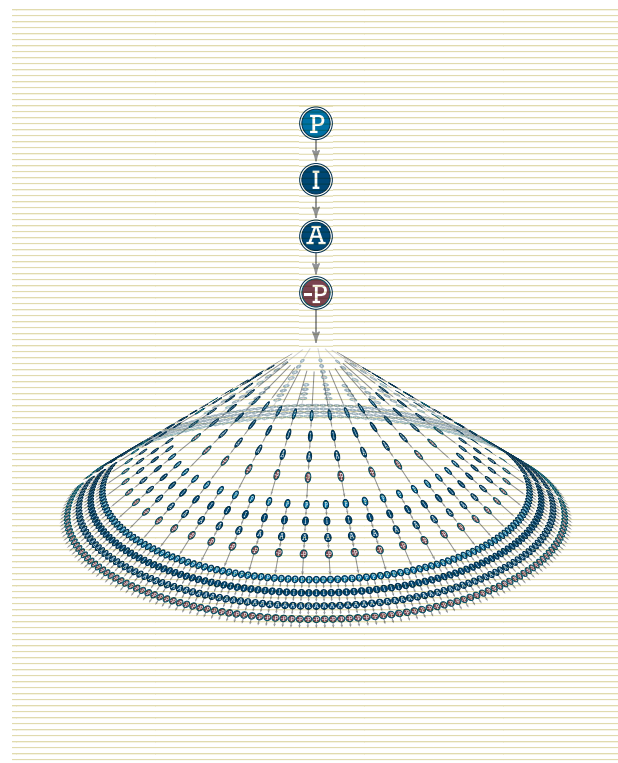
Each cone is simply an element within a larger construct of an endless array of cones (and momentary needles and bowls). This diagram shows the greater pattern.

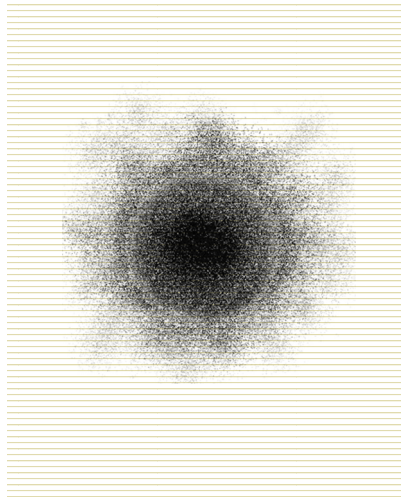
Each individual simply enters the fray at a point seemingly determined by a large number of conscious acts. If one stands back with a more objective perspective it is possible to understand that we are simply called in along the path of some sub-problem. One useful mental activity in the process of problem solving is to realize that you are rarely at the beginning of the process.

WIDE CONES The danger in permitting any problem subsets at all, is that there is no defined boundary between seemingly small (“it’s not my problem” problems) and more significant residual damage (faulty products, environmental disregard, misinformation, etc.). All these unresolved factors do not just emigrate to a Pandorian box, awaiting inevitable freedom; whether unseen or acknowledged they occupy space in the cone diagrams, making them ever wider.

A narrow inefficiency is often recognized and eliminated, but wide cones can become addictive, providing opportunities for exploitation. There is often a personal stake in preserving their existence.

Social trends are sometimes the only force which cause designers to consider areas which otherwise would be left unresolved. The growth of successful litigation against manufacturing provides an illustration. The punitive judgments are indicative of juries being “made aware” of acute problems which (argue the trial lawyers) plaintiffs should have foreseen but ineptly did not. Did the accused solve the wrong problem, or were they maliciously insensitive to the residual problems created by their actions?





A group of people or some other collective entity can often benefit from a wide-cone model. They profit from the noise or inefficiency. In this quaint passage from a 1918 edition of Putnam's Automobile Handbook (written by H. Clifford Brokaw and Charles A. Starr) a literal example of the actual desire for noise is presented.

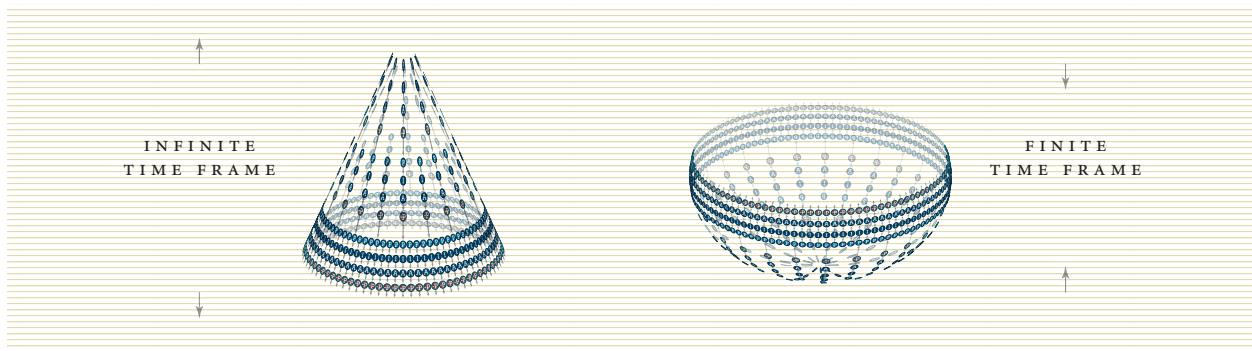
The passage about the automotive muffler begins, "Much despised, detested by many automobile operators and neglected by every chauffeur, and even 'cut out' when the traffic policeman is not around..."

Early drivers believed that mufflers always reduced performance. Therefore, the noise was not only to be tolerated, it was desirable in that it symbolized power. The drawback was that the noise benefitted one and hurt all others. A compromise was the cut out, which could be used in less populated areas. Soon these were prohibited. Our extensive legal system is one example an entire industry created to mitigate sub-problems.

A DISASTER CALLED BOWLING For the bowl model, one must imagine that the base of the cone is "maxed-out." The number of resulting problems exceeds the system's capacity (the points or lines in the circle hypothetically exceed the infinite) and the circle forms a "bowl." The problem is now at the base of the diagram and becomes inaccessible by virtue of new difficulties. These unforeseen and unwelcome guests obfuscate the initial intent. The problem is no longer solvable since the subset of problems has overwhelmed the allowable limits.

The initial objective is no longer viable, and comparatively no longer very important! The quaint

verbal illustration about swamps and alligators presents this idea eloquently: "It is hard to recall that the initial objective was to drain the swamp water when you are waist-deep in alligators." No matter how serious the problems associated with the initial task—draining the swamp—the new danger—alligators—is more pressing. When a situation is bowled the system must cease to function because an abundance of energy must be consumed just to maintain its non-viable structure. The only possibility of its continuance is if the entire system becomes parasitic, maintaining its own structure at the direct cost of another.



In the cone diagrams, the initial problem is at the uppermost position. One can always peek back to it for reference. In the bowl diagram, the initial problem is inaccessible; it lies obscured at the base of the structure. If any problem offshoot becomes more critical than the initial problem the situation can be considered "bowled".

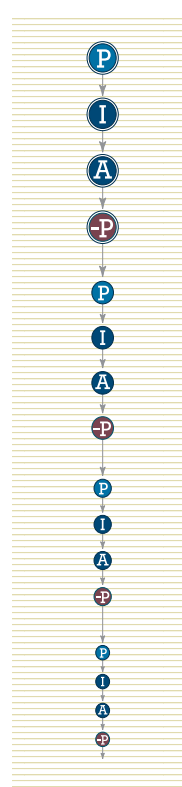
Another interesting aspect of this bowl is that it can be minute in scale. (The cones should be considered more as objects in time than objects in space. A cone can extend through a vast field of time and can travel from person to person, generation to generation, or culture to culture.) A Bowl can be huge in scale, as when a seemingly invincible

and powerful nation begins to crumble in an exponential way; or minute, as when an action is so inappropriate to a situation at hand that all options of resolution are extinguished within the briefest span of time. A subset of problems can engulf an action resulting from poor interpretation with uncanny speed and fierceness.

A SHARP RESOLUTION This last diagram can be understood as two extremely thin cones joined base to base. It is our optimistic ending model, the needle, and a metaphor for a well-conceived design procedure. The needle goes on ahead and crisply supplies the cleavage through which a thread of goodly intelligence is passed. Without the needle, the course of the thread is hopeless. Yet, once the thread is through, the presence of a messenger is nowhere evidenced in the final work.

The needle is therefore a catalyst—it remains unchanged by its contribution. Still, the whole cloth is in some manner reconfigured. The resulting threads of information (as long as they remain structurally intact) will forever bind that which they drew together. Sub-problems are non-occurring or dispersed through a contained system.

The needle diagram represents a controlled understanding of the results of certain actions and a fortunate lack of a subset of additional problems. It represents desired results from wise interpretation of information and a concern for what poor information processing could have yielded. The needle represents the intelligence and foresight to modify while depositing no noise in its wake.

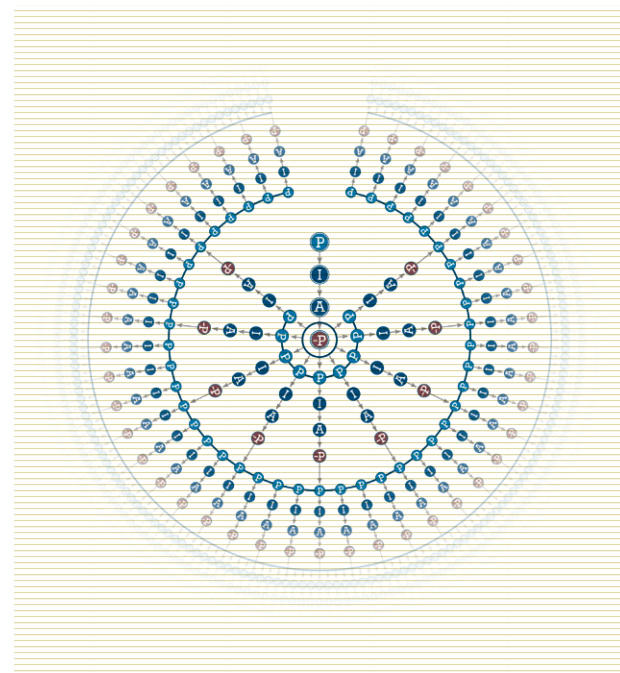


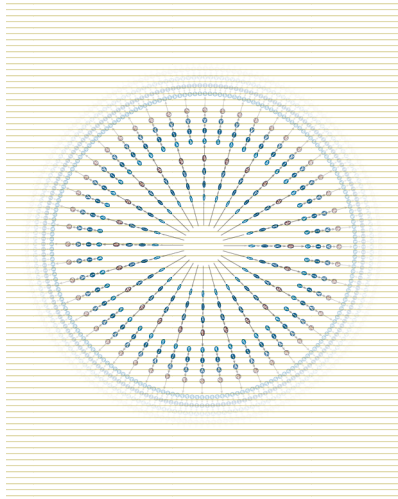
This is the least invasive visualization of a problem and its subsets. To achieve this ultra-narrow cone there must be no remaining sub-problems. This process does not occur sequentially from the top down. The needle diagram must be imagined through an advanced awareness.

The visualizing supposes a kind of reversal, with the future occurring just before the past. The diagram is the result of visualizing a wide cone narrowing to a needle. The needle provides a metaphor for building a “garment of resolution” with a tool that leaves no evidence of its influence.

COMFORT WITH THE UNDESIRABLE All these simple models are visual interpretations of both thoughts and actions. When we envision the results of an intended action, it is already an active response to our current interpretation of the available information pool. We do not “see” the actual thing, but we do see a mental representation of a potential reality. The objective is to employ the relevant sense to anticipate the noise that we may not actually realize until some future moment. Any of the senses can function in this way, for each sense can detect and conceptually reformulate its particular noise.

How can the entire design process be redefined to envision the better solution? How can we look up the cone appropriately and thereby dissolve it? The designer must attempt to envision a Bowl slowly being flattened into a disk, from thence to a wide Cone narrowing into that most desirable Needle. Ideally the envisioning and the resultant interpretation can be so crisply defined that it can actually encompass (the undesirable) possibilities that, now, will no longer occur.





If we can hypothesize the extent of the subproblems it is also possible to fold them in upon themselves and diminish their impact. This diagram is one of several that try to illustrate the advantage of visualizing the sub-problems to mitigate their actual occurrence.

If we can see the difficulties before they materialize two advantages reveal themselves. First, we may take action to staunch the flow of sub-problems. Second we may see inter-relationships that can be created to negate the difficulties from the outset.

Sometimes it is difficult to look into the haze. Most problem subsets occur because the capital (human or monetary) was not available at the outset. This means higher greater capital will be needed to resolve these problems at a later date.

Another cause of looking away from the haze is simple indifference to those who may inherit the problem subsets. This more selfish cause is self-evident in the built world around us.

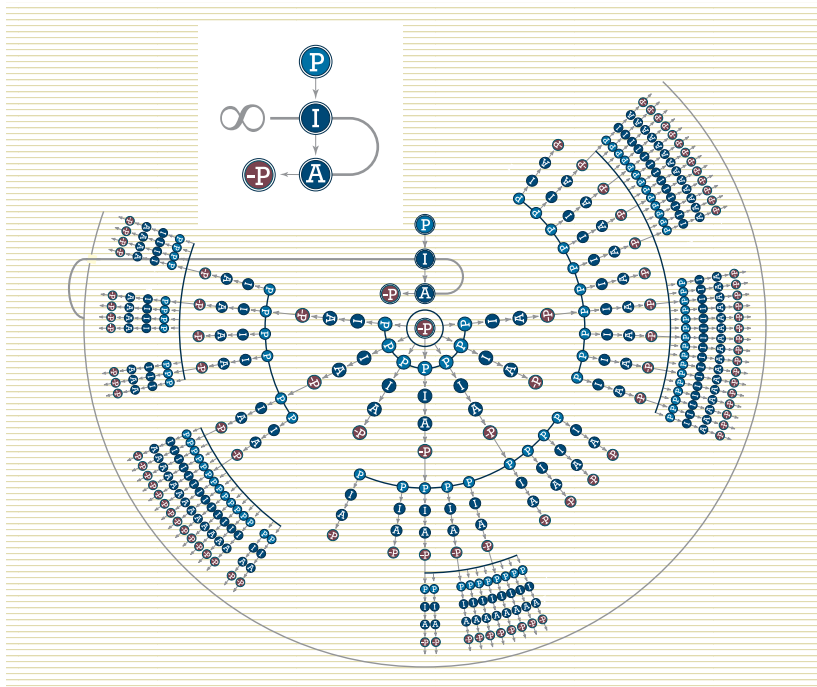
CREATING SELF-CONSUMING PROBLEMS

Creative problem solving implies that opportunities are always inherent in the model. All resolutions are distilled from the inherent noise. The construct must simply be expanded to the point where all worthwhile noise is encompassed. If the mind can create patterns to then control this entity, the noise, of its own accord, consumes the negative surrounding material and then eventually vanishes itself. This leaves a purified hollow for fresh research and pure resolution.

Despite the observation that we are overcome with problems, and problem subsets, the designer must intrinsically believe that every problem can be resolved

to a positive outcome. This does not indicate that any single or collective human entity has the capacity to do so, but the possibility must exist as such. There is always an interpretation that can displace the undesirable.

Even our choice of applying logic must be circumspect. The designer must constantly search for weaknesses in their sense of logic and be willing to admit to shortcomings. If unwilling to question our own logic, nothing innovative can emerge. We cannot analyze a weakness that we claim does not exist.



A single frame in the process of envisioning a cone into an ever narrowing shape is depicted here. The energy of foresight is one factor applied to remove problem subsets and their offspring.

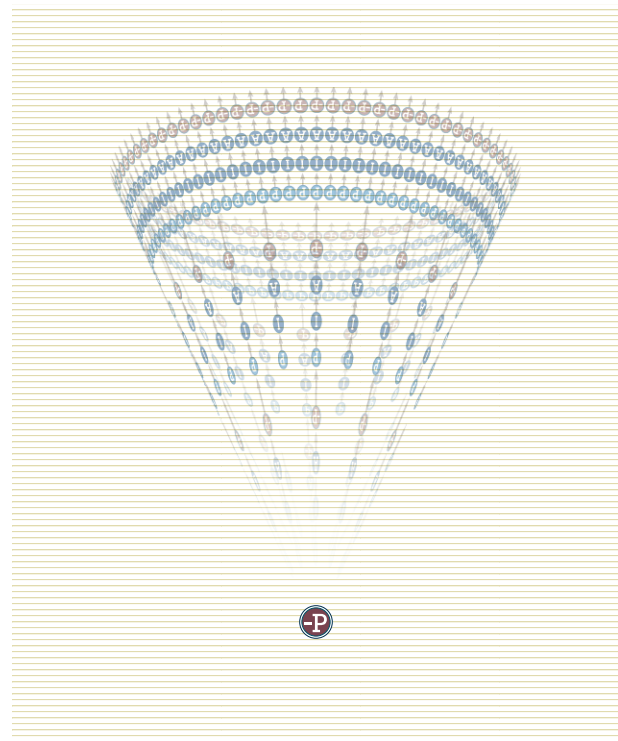
This type of astutely applied energy can become somewhat self-generating. Just as problem subsets can generate outward toward disaster, a proper application of energy toward resolving problems can set a good effect into motion. In essence the problem becomes self-consuming.

ENVISIONING THE PROBLEMS BEFORE THEY

ARE SO The relevant question is “how can I push my thinking towards the more desirable solution despite inadequate capabilities?” The concise answer involves an ideal blending of systematic and non-systematic methods. The approach is derived from a logical interpretation that defies logic as its ultimate authority.

As one moves from the outside of the problem solving fog (condensing pockets of noise) toward useful problem solving, logical systems are required. However, these logical systems are no longer possible at human levels when nearing perfect solutions, thinking must be abstracted through insight and inspiration, i.e., the creative.

Through the process of looking up into the imagined cones one can resolve the problem before they form their demands on time or space. This is a singular strength of human thinking—the ability to envision vast, seemingly unrelated factors into a single pattern regardless of time. Certainly, it is possible to manipulate the cone in the human mind. If it can be adjusted by a fraction, it can be reformed entirely. This permits a flexible problem solver, a true designer, and an altruistic practitioner of the design process.



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 than one may find from one’s supportive peers in a late-night session!

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From PIIMPAPER05: Cognizance & Aesthetic Information © William Bevington, The New School, NY*

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ABOUT PIIM: 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 aesthetic 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, aesthetics, 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.

ADDITIONAL PIIMPAPERS: By the end of 2009, ten PIIMPAPERS will be available for download or on-screen review. The most extensive single document set is PIIMPAPER01, which deals with the underlying structure (the schematics) of informative visualization. Along with these PIIMPAPER, you will find that the institute’s website is an invaluable resource for practitioners, developers, buyers, or end-users of sophisticated knowledge tools. A significant amount of research, as well as a growing repository of information design-based contributions are available, at no charge, through the website. Please be aware that the institute should approve any usage beyond customary research. Short references to our work, is of course, welcome with appropriate citation.

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