



ProNet Practice Notes

QUALITY PARADIGM:

Values, Goals, Controls, Information, and Consciousness

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Everyone nowadays is laying claim to quality. At Ford, quality is job one. GM is putting quality on the road. Chrysler makes the best built American car, and Lee Iacocca can't figure out why two cars come off the same American assembly line, and people prefer the one with the foreign label. Quality has given vanquished economies mighty post war powers. The American posture is uneasy, looking back on neighboring progress for a fix on quality.

The ad men are on it daily; government agencies are asking for quality control manuals; some seek no less than total quality management; yes, the chances are you have some form of quality strategy working or planned.

Quality management is a wildly popular merit badge.

Whose Shoes?

Give popularity a look askance; it runs on a sidetrack. What is constructive about a thing is seldom known by its popularity. Take running shoes. They are good shoes and mostly trustworthy. The people who wore the first running shoes probably were runners, but the shoes got popular. Now, mostly, the people who wear them don't run in them. On the question of who runs, the wearing of running shoes is untrustworthy information. If everyone showed up tomorrow in running shoes, don't bet on the winner by the wardrobe.

You Run in Borrowed Shoes?

There isn't a quality control manual in here. You checked, didn't you? No person in the world can give you quality from a manual.

Some mighty impressive quality control manuals can be found, and they say things finer than the rest of us even know. Still, the people wrapped in them sometimes must stand naked for their appointments in reality.

The quality paradigm explained and applied here is not a manual for following. It is a focal point for reflecting on yourself in many mirrors. Quality comes from there.

We pay too dear a price for experience that we should ever be permitted to waste it. A number of the payments we are making to that account are considered here. They were drawn from the public record that we may each recognize our own time and place in them.

Is Quality Controlled?

I'm not at ease with this "control " business when it comes to quality. Quality Control sounds entirely too self-congratulatory. Quality assurance and quality management unsettle me, as well. They are close-ended terms, and, when I listen to people speaking them, I hear a finality in their voices that says they

have it under control. But quality is an elusive prize. I can't get easy with terms that hint we can directly control it. Think that, and you could lose the richness of the quest for quality in the same way moon shot loses the sustained exhilaration of a lunar rendezvous.

The seekers of rendezvous move to choreography with complex steps, breathtaking leaps, and music; they have harmony and are open to secret possibilities. Astronauts ventured to the moon in the embrace of that. And you will be closer to quality in a rendezvous and more likely to touch and be touched by it.

The quality paradigm sounds a chord of notes to help you find the steps in quality's choreography and hear the music it plays on the strings of your consciousness.

THE PARADIGM

The connection with quality is made by decoding the human behavior of conscious beings and preparation of the individual consciousness for quality results. The paradigm is rooted in the conviction that quality is the result of conscious judgments made to achieve it, and our failures are traceable to dysfunctions in our consciousness.

Within our consciousness, values are gate keepers-opening for some choices, closing for others, and providing "just squeeze by " space for some. They are standards for choices. Controls are the tools we design to manage and inform us of our progress along settled goals. We understand and act on their messages in the context of all the information in our consciousness, which is open to possibilities broadly or narrowly depending on our construction and conservation of information and our individual selves.

The Value Statement

Management is widely charged with setting the goals for the firm, including the quality goals. We stand, but do not rest with that. Goals and values are uttered in the same breath with such nonchalance that I wonder: Do we practice conservation of values separately from goals? We should. Goals are never closer than derivatives of values, and in practice may not support professed values at all. We throw goals ahead of us to march in their direction, but why goals land where they do and why people march to those places and not others is distinguished by values.

Goals yield no common sense, and wisdom cannot be gained from their achievement or failure without knowledge and conservation of the value premises. Absent wisdom ordered by values, our marches make the picture of pachinko balls dropped into reality to score points or not in a noisy descent. The racket we make does not accumulate to our wisdom.

Value premises are distinct from goals by their formation. Goals are settlements. Both individual and organizational goals settle competition over the questions: What shall we do? What will we forego? And, what resources shall be committed?

People speak easily of established organizational values and goals. You should not glide easily over that. As settlements of the choices open to a group, organizations can be said to have common goals. But a common value premise does not arise by any such settlement. Certainly, a number of people can agree

that they hold similar value premises, but that is close correlation of what value is held rather than settlement among values open for choice.

You could settle with me that to achieve the goal of a 10% productivity increase, our partnership will allocate 15% of its cash resources to computer-aided drafting equipment, and we will be bound by our goal settlement.

But could I settle with you that I am bound by your value premise: *Business growth is good*? If we agreed already, that is a correlation. In fact, however, I would spend the increased productivity not on building our business, but on time to kayak the river every Friday. My value premise is: *Confrontation with the object of man's desiring is good*. If you insisted, and I agreed with your value premise as a condition to buying the equipment, I would conclude that, by making the value "settlement," the value premise nearest that is: *Agreement with you is good*. The river is still in the lead, and you would find me there every Friday.

Does that help answer why organizations do not have values *per se* and suggest where to look for values?

Value premises are important to the pursuit of quality, because what is steadily valued (if experienced as wisdom) is the rail that keeps an individual locked onto the prize. Otherwise, a professional does not pore as thoughtfully over the one hundred and first shop drawing at seven thirty tonight as over the first at eight o'clock this morning, or does not faithfully complete a job awash in budget overruns. Of course, an assumption of the value held was made for those statements, and, if the rails are set on a side track, they run a different course to another destination.

How high or low you place the value note determines the tone of the paradigm chord. Some chords are played on the high register; others play lower.

The Settlement of Goals

All quality goals are settlements.

The settlement of goals for quality is a management task; however, it is not a solitary task. Professional service is advice for the guidance of others. Clients purchase advice, and, in the price paid, they largely settle the quality goals whether spoken or not.

I call it a settlement to draw specific attention to the fact that the level of quality is an issue between the design professional and client. It must be specifically settled, else the financial resources to deliver the quality expected will not be provided. The first chance, and perhaps the only chance to settle quality, is the negotiation of the contract for services.

Left unsettled, the client's expectations for quality will likely be quite high (or will be so stated when goals conflict), while the professional's quality goal will tend to center on the fee available to pay for it. In other cases, the prospective client's quality target may be so low that the legal minimum standard of care should preclude settlement.

If you aspire to design quality projects, seek quality in both your clients and yourself. Settle the goals specifically, and determine that they are matched. When they are mismatched, test what values they derive from and learn what tone the project will sound. You cannot play on the high register if the client is intent on other notes.

The Controls

Controls serve three primary purposes: First, a control communicates what management expects the firm's professionals will do to achieve a goal; second, a control provides information to management and the working professionals about progress toward the goal; the third purpose is to raise the stock of people who obtain quality results, which is proof manifested in people of the value held for quality.

Controls, like the goals before them, are derived.

How the notes of the paradigm play a chord is important to staying in step with quality.

The value statement says what ought to be.

The goal is management's settlement of its aspirations to the value stated by its commitment of resources to it.

The control is information about how to achieve the goal and the progress made along the path to it.

If values are not firmly held, goals will be confused, inconsistent, and ill defined. Then, controls on those goals will be pointed in the wrong direction, or whatever information they offer will go unheeded. Light will not cleanly separate the quality achievers from those in the shadows. You will miss the complex steps; your leaps will be into empty space; and your music will sound discordant notes. Finally, the value premises will be exposed by behavior tested in reality.

Quality strategies are typically chock full of procedures, forms, standard design details, and checklists. Particular quality management procedures, for example, a design peer review, a mock-up and test of a structural connection, the common checklist, quality performance evaluation, and the budget to do any of them are examples of controls. Typically, much stock is put in them because they are demonstrations of headway toward quality, but listing them here is not a recommendation for them. I have a different point.

Any strategy for quality is destined to fail utterly, unless controls give the opportunity and the time to act. The initiation of effective controls requires the foresight waiting for you a few pages ahead in "The Freedom to Act" and beyond. Controls are tools for anticipating hazards—that we shall have the opportunity to act in time. Do not get snagged on gadgets here; the most effective controls are those which provide information needed at critical times. You might get that just by listening to what the client is telling you (or what is left unsaid).

Controls are deliberate potentials for disquieting news. They are not the lights on the right seat vanity mirror. Controls are your lasers piercing the night you go into uneasily, sending back the information you need. We move directly, then, to information.

Information

Information is everywhere in the paradigm. Without it, we are conscious beings on perpetual standby waiting for data in grave doubt about our next move. So vital is information that theorists include it with matter and energy as an essential concept to interpret nature.

Design professionals are in particular need of an information theory, because information is exactly the component they add to the building process. Principles are needed to encode information that will empower others to act in predictable ways. No complete theory is handed to us; however, there are tools.

a. Probability

Probability is the linking theory between the sender and the receiver of information. We have need of probability, because the transfer of useful information always involves uncertainty. The measure of that uncertainty figures in the difference between the sender's and receiver's knowledge and the skill of the information encoding.

You can readily see why this is the case. If your knowledge and mine are the same, a transfer of information between us has little uncertainty, but what we exchange adds little to our knowledge. The exchange would become completely predictable, and we would end it. Ratso Rizzo put it bluntest in *Midnight Cowboy* by saying, "There's no use talking to you. Talking to you is just like talking to me. "

The prime purpose of communication is to exchange messages that are not predictable, which is to say we want to send missing information. The outcome is always uncertain. The greater the missing information, the greater is the inherent uncertainty of the outcome, but the potential exchange is all the richer for it.

The rich potential will not be achieved if inept encoding decreases the probability of the intended outcome. Probability will be low if the message cannot be understood. The information will not empower the receiver to act, and actions that follow may be based on information gathered from other sources. You will not have influenced the probability of the outcome (affected, yes; influenced, no). Probability will also be low if the message can be understood in so many ways that the receiver is empowered for numerous possible outcomes.

When information is structured to achieve an acceptable probability of its intended outcome, we come closest to getting something useful from our communications.

Point one is your knowledge that professional advice (drawings, specifications, letters, and conversation) supplies missing information, whose probability of intended consequences is made acceptable, if at all, by skilled encoding. Seeking an acceptable probability focuses the sender's consciousness to the receiver's missing knowledge so that the obligation to fill that gap will be assumed. Success is not measured by what is said. "I made my point! " misses the relevant investment. Dividends are paid on the action taken in response to the message received.

Uncertainty forces us to encode information in ways meaningful to the receiver: Use vocabulary already commonly understood; order information in logical blocks which prepare the receiver for complex missing

information; test the possible outcomes empowered by the information beforehand; use redundancies to limit the possible outcomes.

I hear a few readers barely able to suppress a rejoinder. "Doesn't the receiver have an obligation to comprehend and tell me when there is a confusion about my information?" There is, and, when you are a receiver, you should honor the attendant obligations. The decision will be yours then, but the decision is another's when receiving from you. Do you see? You should aim to influence probability. You cannot pitch poorly on the premise that you are owed good catching.

b. Redundancy

Redundancy makes complexity more predictable. The possibility of error in complex tasks is great, because there are many possible outcomes from their attempt. You can test this by operating a transcontinental car ferry for a few minutes. Traveling by road from New York to San Francisco is complex to begin with, because there are so many possible roads. When you instruct one hundred drivers in New York to drive to San Francisco, unpredictable arrival times are likely. The system of instructions needs redundancy to enhance its predictability, which can be achieved by internal rules. More stability is achieved if only paved roads are allowed. That rule is, strictly speaking, unnecessary information for getting to San Francisco. It is redundant, and it increases order by reducing the number of possible routes. Greater order is achieved by progressively greater redundancy: Use only U.S. interstate highways; use only U.S. Interstate 80. We could go on by adding internal rules on speed, check points, and place and length of rest stops until the reduced number of possible outcomes constrained by redundancy yields acceptable predictability.

One of the reasons both drawings and specifications are issued is to surround a thing with redundancy in a way that makes the result intended more probable. Detail drawings serve a similar function. Redundancy makes the complex system of construction more predictable.

Information theory instructs you to test the probability of your information by anticipating the number of possible outcomes from its use. Too many possible outcomes indicates unpredictability, which calls for more skillful encoding, including, perhaps, greater redundancy.

Finally, an acceptable probability requires knowledge that no communication is ever completely secure. Settled understandings are disordered over time. That is the reason we move on to entropy.

c. Entropy: From the Greek Root Meaning Transformation

Entropy is an additional concept needed to figure the probability that information will have the desired outcome. Entropy describes the tendency of all things to become less orderly when left to themselves. It is the measure of disorder in systems of matter, energy, and information.

Entropy has highly predictable applications in natural systems. For example, in a corollary to the second law of thermodynamics, energy does not alter its total quantity, but it may lose quality. A fully fired steam engine left unattended ceases to function not because total energy is less, but because its energy is dissipated from a highly regulated form in the boiler to a randomly organized form in the atmosphere. When cold, the engine's energy system is at maximum entropy.

Claud Shannon's work on information theory at Bell Telephone Laboratories, published in the July and October 1948 issues of the *Bell System Technical Journal*, is the prototype scientific application of entropy to information systems. Shannon theorized that information in a system tends to lose quality over time by progressive transformation from an organized form to an eventual random order. At maximum entropy, the information has so many possible arrangements that nothing useful or predictable can be made of it. Missing information is then at its maximum; outcomes are highly uncertain, and predictability is very low.

For example, a beaker of seawater in one hand and a beaker of distilled water in the other represent a highly ordered system of information about their contents. The information is significantly disordered when I mix them together in a single beaker. When the mixed beaker is drained into the ocean, complete entropy of the information is reached. The order of matter and information is completely random, and no use can be made of it.

Entropy is ubiquitous. You likely discovered its consequences when you first remarked, "When did we start doing things that way? Whatever happened to our practice on doing things this way? Who gave them the idea they could do that?" The when, whatever, and who is entropy.

Entropy is systemic. A firm with many branch offices is headed for disorder in numerous systems, which will account for some of the confusion among them. The decision to set up a new department is a decision to risk entropy in a new system. A decision to locate one firm in two buildings is just asking for trouble. Entropy, you see, is also a concern of effective architecture.

Let's check in on our car ferry business. Shannon's corollary predicts that over time our highly ordered way of getting reliable arrival times in San Francisco will fall apart: Our drivers will seek scenic diversion; they will ignore the route rules; they will overstay at Jesse's Highway Diner; Jesse may add new diversionary information; some maverick drivers will break the rules and chance acceptable arrival times; replacement drivers will ignore our rules and try the maverick routes. Left unattended, missing information will tend to grow, the possible outcomes will increase, predictability will decrease, and, at some point, total entropy will be reached when all arrival times are equally likely. There will be no information in the system we can do anything useful with.

d. Open and Closed Information Systems

Theorists postulate two fundamentally different kinds of energy, matter, and information systems. Open systems grow in complexity despite the demonstrable effects of entropy, while closed systems wind down on the entropy clock to eventual randomness. The cosmic scale of this notion makes a delightfully heady place to romp. Don't miss the opportunity. Solar systems that can exchange matter and energy with other systems grow, while a solar system closed to exchanges will collapse. Worlds are made and lost here. One fate or the other awaits people orbiting within information systems.

A closed information system resists exchanges. It busies itself with cybernetic enforcement of the system extant. Closed to disruptive outside influence, it may be thought stable, but the apparent stability carries the seeds of self destruction. The closed system will not change, but the surroundings do not stand still. New possibilities are unwelcome and do not spin off as innovative systems of greater complexity. Information missing in the closed system will approach maximum. The entropy alarm will sound; no one will hear. The Soviet Union is a deliberate, real life laboratory of that-with consequences. It is not by

information gathered from coincidence alone that *glasnost* sounds at least a quarter note in the trumpeted Soviet economic reform.

An open information system is very nearly the opposite. It thrives on exchanges. While entropy is running the clock down, an open system busily spins out new subsystems of greater complexity. The clock will run on them, but they are replaced by higher orders of complexity. Open system characteristics predominate in the system that encircles the design professions and construction industry.

But you might be tempted to believe the entropy clock has run quite far if you compared sets of drawings for yesteryear's grand old buildings with a set for an ordinary recent building. The grand and old may have been built several hundred years ago from a dozen drawing sheets, while even the quick and dirty model today takes several times that. Is there that much more missing information today? Is the difference in those drawing sets the measure of entropy in the system? It probably is not.

If the design and construction information system was a closed system, then I would answer, yes, that entropy was greatly advanced. In a closed system, we would be constructing basically the same building today as a century earlier in substantially the same way, and, if it took triple the number of drawings, that would be clear indication of enormous missing information. You would expect a highly disorganized industry.

None of that is the case. The construction industry today is more highly organized than a century earlier, and its projects are increasingly complex. In its open system, load bearing masonry got transformed into structural steel or reinforced concrete, both with curtain walls, on to geodesic domes, onward to space frames, and out, we might predict, to delicately webbed cities sailing in orbit.

Did I answer why there are more drawings? There are more because greater complexity has multiplied the potential outcomes, which design professionals endeavor to regulate by greater redundancy.

Your chore is to battle against entropy (and other sinister opponents) within a worldwide construction information system busily spinning out ever greater complexities. And it all happens not in glacial time, but so luckily that the greatest complexity has developed in your lifetime. It must be very exciting for you.

e. Something Profoundly Optimistic

Ilya Prigogine, Nobel chemistry laureate in 1977 (nonequilibrium thermodynamics), theorized that (despite entropy) ordered information can arise out of disorganization in complex open systems, and he observed in 1979 to *The New York Times*:

This is something completely new, something that yields a new scientific intuition about the nature of our universe. It is totally against the classical thermodynamic view that information must always degrade. It is, if you will, something profoundly optimistic.

We will want to find a personal entrance for you into the profoundly optimistic behavior of complex open systems.

Your entrance is not in the size or complexity of organizations providing architectural or engineering services taken either separately or combined. That system is minuscule in isolation. But complexity on the significant order required for profound optimism can be found. It is in the complex being that you are. Look for the door in the cognitive capacity of each person for billions of potential connections multiplied by the junctions possible with every other person. Your entrance is in the fields of mixed flowers discussed very near your next destination in *Consciousness*.

f. Points of Information

Information is everywhere in the paradigm, and, strategically, it is just before our time in the *Consciousness*. Information theory is the probability of your supplying missing information. Your consciousness embraces the capacity to see the measure of that and the many other uncertainties you face. The approach to quality is made when you act on your measurements of all the uncertainties you see to affect reality with careful, harmonious, conscious choreography.

Consciousness

a. The Place of It

The music in the quality paradigm is all single notes until they are written in a chord. The place of consciousness is to order the notes, record them, and sing the chord.

If you would hear music from stone, steel, and glass, stand before a building you admire and ponder: Why does it stand? Why does it endure? What in it stirs my admiration? An explanation for its standing might be all laws of physics, its endurance all properties of materials, and the stir in you the emotive power of elegance or grace.

In *Departures*, a journal ended by his death from cancer, Paul Zweig wrote that we live in a "double sphere of consciousness. " The near shell is occupied with our immediate needs, "full of urgency, heavy with the flesh of our lives, " but the outer sphere takes us, "into the future where we pretend there is time. " Time in the outer sphere is our "experiment with immortality without which books would not be written and buildings would not be erected to last centuries. "

Pause here and listen. The human music is playing all around you. The building you admire stands and endures because it stood first and endured first in the consciousness of its designers and builders. The building was an experiment with immortality that has lasted long enough to capture you, and it was made into art within the private estate of your own consciousness. Between you and some remarkable people, perhaps now gone, a great building has been created. It is exquisite work.

It might not have been great at all. A different consciousness by any one of you, and the building could have been ugly, dilapidated, or collapsed, but I thought you should be fortified first by beautiful music.

b. The Working Parts

Consciousness has the function to show us information inside and outside of our bodies, so we can order and evaluate it and instruct our bodies to act on it. Control over information is the hallmark of conscious beings.

The leaves of the *Silphium laciniatum* plant line up in a north-south direction to catch the morning and late afternoon sunshine, while avoiding the damaging mid-day sun. It is known as the compass plant for its reliability at reading sunlight and answering its genetic code.

The human nervous system has evolved more complex capacities. We are conscious not only of a perception of light, but also of the sensation of its intensity and color, the fact of the speed of light, the memory of a nap we once had in the light of a winter's day, anger at being awakened prematurely, the intention to install shades, the value of eyesight, the desire to write an ode to light. All these (perception, sensation, fact, memory, anger, intention, value, desire) are additional bits of information available to the conscious mind

Consciousness exists when specific mental phenomena are occurring and you have powers to direct the intended courses. Intentions are bits of information which order other information in the consciousness. Intentions profoundly affect other information. Their effect is to reject information, rank it, interpret, synthesize, and order our bodies to action along particular paths. As a result, our consciousness is filled and continues to grow with intentionally ordered information.

c. The Self: Fields of Mixed Flowers

All compass flowers will, in obedience to their genetic code, align their leaves on the light source. A field of them has no dissidents and, as a result, limited potential; however, each conscious being has the capacity to intentionally order information differently. The behavior that results may be quite dissimilar among individuals. There is danger in that, of course, when managed unwisely, but the potential combinations of thought and action can yield complexity on the scale of cosmic numbers. Here is your personal door to the profound optimism of complex open systems. The management of it is the key to its opening or its closing.

Each human being carries an ordered set of information termed the self. It is the ordered set that tells you who you are. If a self set was read aloud in a crowd, someone would likely respond, "That's me, my identity! Where did you get all my private stuff? " That is how we would know whose set it was.

The self is a private estate and by far the most luxurious you can construct. It offers you command over billions of potential mental phenomena, and, when opened to connections with others, you have immense potential.

The self is a potent set. It is loaded with a lifetime of experiences: passions and pains, goals, values, convictions, and intentions. Information in that set is potent because it was ordered for the survival of the self ("That's you! "). If you do not remember ordering your potent set, it is because you had a great deal of help (some useful, some inhibiting) from family, school, society, and a very long, recorded genetic code of homo sapiens' experience on this planet.

Information that threatens the self will set off a quake in the consciousness. Adaptive strategies are quickly implemented; consequences can be ruinous and range far. The threatened self has but a few possibilities and they are urgent, heavy with the flesh of life.

Information that suppresses the self will cause a range of adaptations from passivity, resentment, to rebellion. We restrict our own opportunity when we initiate limitations in others, or when we fail to petition their potential. A thwarted self may find its final revenge in conformity. The point/counter-point between the proletariat and the withering state is: *They pretend to pay us; we pretend to work.* We are more at risk from another point and counter: *They pretend to hear us; we pretend to think.*

d. Mixed Flowers: Our Door to Profound Optimism

The door to profoundly optimistic complex systems is opened on the hinge of a consciousness free to act. If you think something very simple was just said, I join in your thought, but its simplicity gives no clue to the stubborn determination of people to confound it. The picture they make is a room full of them dutifully closing doors with one hand on the fingers of the other in their grim determination to discover what characteristic of doors is responsible for such excruciating pain.

General Electric caught itself in a door of its own making when it decided in 1983 to mass-produce rotary refrigerator compressors. The story is told on the front page of the May 7, 1990, *Wall Street Journal*. The reporter found that the product development phase was under severe time pressure to gain advantages over foreign manufacturers. Based on the lab test of about 600 compressors in 1984, mass production was commenced in March, 1986. Field testing was cut from a planned twenty-four months to nine. User failure reports commenced in December, 1987, about 21 months after production. By March, 1989, defective compressors had compelled GE to take a \$450 million pretax charge for about 1.3 million compressor replacements.

The lab testing had consisted of running prototypes under harsh conditions for two months. It was intended to simulate five years of normal operation. One GE testing technician of 30 years experience had repeatedly told his direct supervisors that he doubted the test conclusions. Although the units had not failed, there were visible indications of heat related distress: discolored motor windings, bearing wear, and black, crusted oil. None of the warnings to his supervisors (three supervisors in four years) were passed on to higher management. An independent engineer urged more severe testing, because there had been only one failure in two years. That was suspiciously low; the news was too good, but he was overruled.

Examination of failed field units disclosed a design error responsible for the early wearing of two metal parts that, you guessed it, caused excessive heat buildup leading to failure.

GE had declined to walk in the field of many flowers. It wanted an early success with every head turned the same direction, and it got that. But key cognitive connections were lost: GE had declined an offer of help from the engineer, who in the 1950s had designed the GE rotary air conditioner compressor; the testing technicians and independent engineer were not heard; no one dared insist on the longer field tests desired, because, "It would have taken a lot of courage to tell (the GE Chairman) that we had slipped off schedule." The senior executives, walking in the field of silent flowers, petitioned only good news.

Lessons at GE were paid in money and prestige. The replacement GE Chief of Technology and Manufacturing was quoted on the lesson he took from his predecessor's experience: "I'd have gone and found the lowest damn level people we had...and just sat down in their little cubbyholes and asked them, 'How are things today?'"

Well, everybody has a story to tell. Don't you wonder what is low and little about that place? Do you wonder who is damned there? After all that passed, do you suppose "please" is too lavish an offering for the door to profound optimism?

e. Back on Our Drawing Boards

Design professionals should mark well every door to the consciousness and install freely swinging hinges in both directions. You make your services out of judgments formed in the consciousness. The primary "things" that demonstrate their worth (the drawings, specifications, your advice) cannot be better than they are in the consciousness.

I will allow that drawings and such can be checked. They could get better by checking; however, I hold to my point on the consciousness, because checking drawings is not like checking any other "thing." If you made ball bearings, all the information about their quality could be quickly known. Metallurgy would give the properties of the steel, laser measurement would test thousands of them as fast as they rolled by, maybe test a sample to destruction, and a bucket of bearings would be right to specification.

But the quality of designs is not tested that way. Obviously, it is impractical to rely on a check of the final construction for proof that the design was good. A twenty-four month field test would have helped GE, but is an untimely control for you. Instead, a drawing checker looks for indications apparent on the drawing and in key calculations, perhaps, that the preparer met the standards for design. One consciousness checks what another has revealed about itself on paper. It helps. Two heads can be better than one here, but it remains a fundamentally different check and pass than you get on ball bearings. A laser sees every ball bearing the same way. One consciousness will not see the same drawing another consciousness sees. There is both benefit and mischief in that.

Judgments in design develop one on another until what appears on paper may mask deficient work many steps back. The indications become less clear. Designs are not dismembered step by step when they are checked. Construction documents are not checked by duplicating the work any more than the knots in a Persian rug are tested by untying all of them.

The point is, all that you do is tied in your private estate on strings of consciousness. You have the first and best chance at quality there. No one after you will have a slate as clean and clear. We will visit inside your private estate later in *Putting the Paradigm in Motion: Learning to See*, where we can explore what you might mark on your slate.

Summing the Paradigm

We readily and correctly credit glorious design and elegant engineering achievements to the finest work of our most able design professionals-to the most effective consciousness. To find the causes of failure in

services that are based on judgment, we will reach closest to their roots in the dysfunction of the consciousness, where information, and the values, goals, and controls of the paradigm are ordered.

THE FREEDOM TO ACT

Reading the Race Reports

The human species is a physically weak contender, but it has taken planetary leadership by exploiting, among other things, an enriched brain.

Much is owed to the brain, yet our use of it is a paradox. Only a part of it is applied to outrun the surrounding Chaos. With that, we bravely pick our way through indifferent forces and cosmic coincidence. Another part we give over to constructing comforting race reports about the absolute security of our pack-leading position in the food chain. Entire firms, indeed whole cultures, issue themselves favorable race reports. We believe ours. We believe each other's when quite convenient.

Smug satisfaction with our own race reports is unwarranted self-congratulation. By listening to them, we lose the freedom to act creatively, decisively, and effectively. We surrender to entropy in our information system by disabling our consciousness. We stun exactly the faculty needed for agility and proficiency. We are overtaken, outmaneuvered, and the prize is lost.

a. X On the Reef

And we can lose woefully. Those who are captains of firms take a lesson! Before there was the agony wrought by the *Exxon Valdez*, there was an opportunity to determine its rules of operation. The reasoning against allowing passage of super tankers from Valdez, Alaska, through Prince William Sound was to many minds convincing, but it was finally silenced under a thick blanket of government and oil industry assurances of extreme safety, profound expertise, and good intentions. There was to be virtual "air traffic" quality control over the sea lanes beginning in 1977. Why that was a comfort at the time remains a mystery.

Years without fatal incident were sweet succor. Every player, from ship's captain, Exxon president, Alyeska, and the State of Alaska to the Coast Guard, readily accepted obliging race reports. Bligh Reef wasn't one meter further out of harm's way, but the consciousness had new information: The shoals near Bligh Reef had been passed hundreds of times without incident; no oil tanker had been holed in Prince William Sound; the oil fields drained into Valdez, Alaska, had peaked, and the campaign was on the down slope side of economic maturity.

At Exxon and Alyeska, that information was ordered by intentions to improve profits. Equipment and manpower were cut, safety and cleanup systems were disabled, and the surplus was siphoned to a thickening, black bottom line.

The *Exxon Valdez* had clear sailing as far behind as the eye could see. Bligh Reef waited. If the cosmos played at tag, its mechanics must have watched rapt, while, on March 24, 1989, Bligh's prize was delivered by current, wind, and human fallibility heavily laden and hard aground. The *Exxon Valdez*, gorged with obliging race reports, belched sickening defeat.

Are we unfair to Exxon and the *Exxon Valdez*? Couldn't they, after passing Bligh Reef and clearing Prince William Sound safely time after time, prudently lower their concerns and preparations? They could not, because each passage was an independent event. The conditions on one passage were not the same as the next. Variables of sea, weather, and crew preparedness were different for each, and they were different on March 24th. Only Bligh Reef was unchanged. Belief in Exxon's race reports was no more prudent than your using the same soils report for all projects on Main Street.

Repeated success with similar independent tasks enhances the qualifications for the next attempt, but it does not suspend the hazards encountered. Architects and engineers, who have designed this or that project type dozens of times, may have paramount qualifications for the work; however, they have not suspended the hazards. Success talks, but it can speak praise we should not honor.

b. Controls for the Barely Conscious

What sort of controls are expected from people slowed by their own race reports? People intent on the rear view mirror need a great deal of time to act in response to controls. They do, but they don't know it. They are cozy in a closed information system, free from the perception of uncertainty and blind to the possibilities.

Aboard the *Exxon Valdez*, it was a control that the crew shall: "Call the Captain's quarters for instructions abaft Bligh Reef. " As a control, it was designed to give the Captain notice of the approaching reef and an opportunity to give his instructions. The goal was apparently to pass Bligh Reef without bloody running hard up the back of it.

How do you rate it? Some use a similar control: "Check the drawings before release to construction. " That is a point on your chart just abaft Release Reef.

The control increased the Captain's time and opportunity to act in one way. It gave him a single point in time to check where the *Valdez* was in relation to Bligh Reef and the same single opportunity to correct his course. Next stop: Bligh Reef.

It was not a wise choice among so many better ones. For example, "The captain shall remain on the bridge until Bligh Reef is cleared. " The time and opportunity to act is increased, and there are bonuses here: The price for a captain on the bridge is the same as a captain in his quarters; a captain at the helm more likely has a consciousness alive to the hazards than a captain on the bunk.

Would you add a ship's pilot to Exxon's quality program? An expense authorization from Exxon is needed for that. The time for it was in 1977, when the goals were settled. It is too late now, of course. Quality is built into a project at its beginning, if at all.

c. Summing the Entropy Oblige

Cosmic machinations made Bligh Reef the winner by patient waiting, but not you and me. Humankind is competition against Chaos only as the eager, agile beneficiary of a remarkable ability to remake itself by adaptation. The ability to add experience to the consciousness, indeed, to add gainful adaptations to a

flexible genetic code, are qualifications for planetary leadership. We are not obliged to listen to the siren's song of numbing contentment.

We race against the sands of time. The freedom to act is power to our legs and mind. Powers absorbed in issuing and receiving obliging race reports collect sand. Silica petrifies us; we slow, then we die.

Shaking the High Wire

a. Entrustment of Judgment Workers

The manager aiming for quality results needs to take care with the people entrusted to the project. We speak carefully here. People are neither entrusted to the manager, nor is the manager to take care of them. Judgment workers are committed to the project, and they take care of themselves.

Design professionals are judgment workers. They typify the workers fast dominating the kind of labor done in America. Specific qualities recommend them.

Judgment workers are distinctively goal directed, highly motivated individuals, who have arrived where they are by selecting ever more demanding and specialized careers. Their paths were deliberately chosen, and the personal stake in them is high. They are the guardians of their own investment in values. Paths of action supporting personal goals and values are beneficiaries of their personal stake. Contrary paths clash strongly with the potent set, which can initiate conflict and ultimately threaten the self. Unclear or conflicting goals can create conditions of siege.

Care was justifiably taken to say that judgment workers are more likely committed to a project than a "boss, " and they take care not of themselves. Please note: That statement is not in the least equivalent to, "They look out for Number One. " More often, the people I describe will inflict substantial penalties on Number One for the benefit of the project. Whether management receives the benefit it seeks from their work depends on the care management takes in its tasks.

A firm of consistently and skillfully managed judgment workers can achieve wonders. A firm managed with discrepant values, goals at cross-purpose, or with conflicting information can set loose its own Golem.

b. Seventy-four Seconds in Tribal Time

The seminal experience in failed engineered systems was thrust on the world by a project honored with stunning successes. The launch disaster of the space shuttle *Challenger* on January 28, 1986, the twenty-fifth shuttle program launch, was all the more shocking because of its management and engineering reputation. The presidential commission convened to investigate the *Challenger* disaster concluded that both the launch decision process and critical rocket hardware were flawed.

The facts showed that, while *Challenger* was fueled, manned, and ready on the launch pad, Morton Thiokol booster rocket engineers raised a launch safety issue with Thiokol management. They had observed on previous launches that the synthetic rubber O-rings sealing the joint between two lower sections of the solid rocket booster had been damaged by hot gases escaping from gaps around the O-rings. The damage

was most pronounced on cold weather launches. If launched as scheduled, *Challenger* would make the coldest test yet; there was potential for disaster.

The position of the dissenting Thiokol engineers can be well appreciated. NASA launch safety procedures required a "Go " for launch from Thiokol. The issue raised by the engineers had consequences, not only for the immediate launch but also for the safety assessment of all prior launches, future launches, and Thiokol's reputation.

The commission disclosed that there was debate. There was consideration of information. Ultimately, the engineers would report experiencing a shift that put them on the defensive. They would say it was as if the rules had changed. Previously, the control on "Go " for launch was, "Prove it is safe, or do not launch. " The Thiokol engineers in the *Challenger* launch circumstances perceived a new control: "Prove it is unsafe to launch, or we launch. "

The consciousness of Thiokol's management was not swayed by the debate or by data that could be marshaled while *Challenger* waited. Finally, the engineers were asked by management to, "Take off your engineering hats, and put on your management hats. " In only a short time, the engineers withdrew their safety issue, and the Thiokol "Go " for launch sent *Challenger* into space history.

c. Obviously a Major Malfunction

Just the thought of beginning the discussion is daunting. The events are close and emotional. This and all the cases here exacted tragic costs. Still, we are seeking lessons, and the learning of them is a small repayment to history.

The strong intentions expected from goal driven specialists were evident in the Thiokol engineers. The space shuttle program is an ultimate specialty. There is one and one only. The information they had (previous cold temperature, O-ring damage, and it's even colder now!) got channeled by strong intentions for safety right to the top of Thiokol. That could not have been pleasant. Playing the rock in the middle of the road resists other strong information in the self: intention to be loyal to the firm, intention to support coworkers, intention to advance one's career, and intention to support prior launch decisions (when no warning was given). After twenty-four successful launches, the potent self risked a considerable setback by speaking out.

The warning was spoken, and, importantly, it was given in response to a perceived control: "Prove it is safe to launch, or do not launch. " That was the discussion the engineers expected and were prepared to have. But the discussion and the control were reversed. The engineers would not likely win the case, "Prove it is unsafe, " because the consciousness plainly did not prepare and order the information that way. You can hear the consciousness scream, "It's a little bloody late to change the rules here! "

Management shook the high wire. Now, there were key judgment workers off balance. The Thiokol team had reduced effectiveness.

Now, the Golem was set free.



ProNet Practice Notes

Changing the rules on the high wire has unsettling effects. There is new information in the consciousness: Management is inconsistent, management is unfair, management doesn't trust me, and I just might fall from here. The potent self gets punched hard when the rules are abruptly changed. When the O-rings were not proved unsafe, Thiokol's management asked the engineers to think it over, but, this time: Take off your engineering hat. Put on your management hat.

We cannot pry open the engineers' consciousness to find the twisted metal memory of that moment, but we can analyze the conflict provoked by such an instruction.

We honor a prohibition in arguing cases to the jury. The rule prohibits any attorney from arguing the Golden Rule. Counsel for plaintiff may not urge the jury to put itself in the plaintiff's shoes and decide for the plaintiff what the jury members would want decided for themselves. Defense counsel can't argue the Golden Rule in the defendant's shoes, either.

Why it is a rule is easily tested on this whip lash case:

Ladies and Gentlemen of the jury, if you would but put yourself in my client's shoes, paralyzed, numb to the world of feeling from the neck down, cut off from hope for any normal life, a tormented head condemned to ride a dead body to its death-if you would do that, then, this is the question I ask of you, "If you were this person, what would you want your jury to do for you today?"

How, from this position, shall a juror satisfy the duty to hear all the evidence and fairly decide the case bearing no prejudice to either side? I know I want the money, lots of it, and so do you! There may be saints (or are they brutes?) unaffected by the argument, but the system of justice does not chance it.

Next try the fit of this:

Engineer, take off your engineering hat and put on your management hat: If you were faced with aborting this space launch in front of the world today, and, if you would then be required to face the press, NASA, Congress, and the President of the United States to explain why the Thiokol rocket is unsafe, what would you want your rocket engineers to do for you today?

These words, of course, were never spoken, but, under the circumstances (*Challenger* waiting at the "Go" line for a Thiokol release, the potentially embarrassing safety debate unresolved, the immediate need for a decision), prudent systems of management (like prudent systems of justice) do not chance the consequences of shaking the high wire in that way.

Remember what is included in the potent self set. Here are the values, goals, hopes, loyalties, ambitions, and desires. Shaking a person there sets the high wire into wildly accelerating waves. The person either holds on against wave after wave, or he lets go of the position.

And if the position is abandoned under pressure, what has management tested? Has it tested the merits of cold weather O-ring integrity? Does the question somehow clarify the understanding of any properties of O-rings and the behavior of combustion gases? Could it ever? If it couldn't, is it sensible to put the conflict into another's consciousness?

And if the position is abandoned, is a new set of values installed that, because of a narrow reference as an engineer, could not be seen except by playing at management? Could it ever?

The instruction does one thing: It abruptly tests whether or not a person for that moment valued agreement with management, the tribe, the hunting lodge, to such an extent that it would override confidence in a contested engineering judgment and the intentions that ordered it.

That is galling in the extreme; hold on to it for the lesson taught in architecture and engineering. The control, "Prove it is safe to launch, or we do not launch, " supports the goal, "Safety First, " and the value premise in the lead of that is: Human life is good.

Try that brief metaethical exercise yourself, beginning with the control, "Prove it is unsafe to launch, or we launch. " Play the notes back from control to goal and search out the value premise in the lead of it.

We will wait here for you.

Are you back? Now, try it again with the control, "Prove it is unsafe to build, or we build. " Did it take long this time?

The test result in this instance was that Thiokol engineering did value more its agreement with Thiokol management, and it took momentary solace in that agreement from the 24 prior launches.

A key engineer remarked later, "We may have gotten too comfortable with the design. " You can hear silica replace key carbon cells in the registration of obliging race reports. Entropy unchecked had progressively disordered the boundary between a safe and an unsafe O-ring design. Framed in ghostly margins, a man pitching on the high wire could just make out a "safe enough " design in a thoroughly bad one.

By all of that, Thiokol had progressively reduced its freedom to act. The opportunity to save Challenger was lost.

d. Little Boxes, Bureaucrats, and Children

The presidential commission was besieged by a NASA and Thiokol technical polemic on performance of the O-ring in cold weather. The seventy-four seconds was presented as indecipherable coincidence and accident, but Richard Feynman, Nobel physics laureate in 1965 (quantum electro-dynamics), finally cut to the chase. Feynman dunked a clamped piece of the synthetic rubber O-ring into a glass of ice water to simulate the preflight conditions. The material did not rebound; it could not fill gaps in the cold. Misjudgment had entered there through bare millimeters. Golem was Challenger's eighth and its fatal passenger.

Test and hearings done, the commission concluded that NASA must rework its launch procedures to encourage a flow of additional information from more people directly into the launch decision.

NASA broke up some of the little boxes. That helps. The DC-3 aeroplane was designed prior to 1936 in a hanger without walls between the engineers, wing, tail, instrument designers, or anyone else. When you

wanted to know something, you walked over to the person doing it, and you displayed what you were doing.

But there is a question bigger than little boxes: Whose stock was raised and whose fell by this quality disaster? The key engineer, who rose to answer the launch control, fell; he lost his job. The one and only space shuttle program is over for him. Thiokol, however, is busy today making more NASA space shuttle rockets.

Yes, everybody has a story to tell; it turns on a question of economics, they say. It turns there, but it twists and it contorts before us on the values exposed by behavior. Children can figure the lesson, and they do.

e. But I Would Never Shake the High Wire

Actually, I don't accept that, and you don't either. There is motion in all high wires. Some anxiety makes the trip interesting, and judgment workers will seek unsettled circumstances for the challenge in them.

Challenger's circumstances are dramatic to the point of exhaustion, but the high wire sways for people in more ordinary circumstances: The project architect or engineer trying to meet a release date or a budget, leading the largest project ever, leading a project gone sour, managing the new department or profit center, opening a new market for the firm.

All involve a critical test of the self. Although tests do build strength, time on the wire is taxing. An individual without options may implement self-protection plans harmful to quality: Ignore unfavorable facts that would draw criticism, leave problems unreported to avoid early judgment, end or abbreviate the professional service when the schedule or budget is exhausted just because it is too great a hassle not to. Problems may not surface until the freedom to act is largely lost.

How to send a call for help with immunity from a self-damaging counterstrike is key to keeping people in balance on the wire.

f. Getting Help on the High Wire

Auto assembly line management uses a technique that I like. By it, management determines, with input from workers, what tasks can be done on the car at a "station" limited by two lines painted on the floor. That puts the worker on a wire. Auto carcasses are run between those particular start and goal lines, parts are lifted, placed, fitted, and fixed one after another.

Ready to start? Action! Cars are rolling, and parts are fitting quickly, tightly. It's going well, and we are making good cars today, but what happens when the worker sees that a carcass might skid across the goal line before the assigned work is done? Are we going to lose another one off the wire? Will I get the leaky windshield, will you get the magic self-opening door? Not this time. The worker will hit a button that sounds a horn, and the horn will tell the floor section foreman to get on the line and start slinging parts. Bravo!

What I like most about this is not that both management and workers contribute to goal settlement (one good idea); it is not that management pitches in (another good idea); what I like is that the horns go off routinely. People use them, and that says the people have trust. That's what I like!

You are on a high wire. You will put other people on high wires. None are afraid of heights, and the view up here is exhilarating. You can see buildings from here that will last for centuries. And they will, too, if every high wire you construct has a safety valve people trust enough to use regularly.

The Focus Filter

The consciousness operates full time, unless it is turned off by sleep, injury, disease, or death. While we are conscious, we have the power to receive and order information. The raw potential of our consciousness is great, but it does not mark the boundaries of our actual consciousness at any particular time.

In the 1930s, researcher Jacob Von Uexkull applied a technique in environmental studies for framing what the animal sees in the environment. Whereas, in oversight, we see the animal in the environment, the individual animal perceives the *Umwelt* or the self-world.

As planetary leaders, we are accustomed to seeing the environment, and we easily assume that is our world. I think we do that because we claim a victory that allows us to survey from the top of the hill. In fact, we have the greatest need to see ourselves within our *Umwelten*.

All the information an individual perceives about what is happening at a particular time is, for that moment, the individual's *Umwelt*. It is the world perceived, or the self-world. That you are in your *Umwelt* necessarily means that you do not see the environment.

The self-world for one person differs from any other's. From place to place and culture to culture, the differences cause people to see separate worlds in the same space.

The Inuit peoples hunt vast Arctic grounds without maps pasted to their sledges or kayaks, and they continue the hunt through the long winter even without a reliable sun fix to guide them. Take a long trek with a hunter, and figure how to return. While you and I are looking for North, East, or for *Silphium laciniatum* compass plants, the Inuit hunter has taken account of the direction of the wind monitored by the motion of it on his fur hood. He has noticed the ocean currents, memorized the color of the ice and ocean, the texture of the snow. You are lost in an *Umwelt* ended at the tip of your nose. The Inuit hunter wonders how you lived so long in your land and surmises everyone there is starving.

Back home, your *Umwelt* is larger, but it is still a source of troublesome flux. You concentrate on one thing, and you miss a message on another. There are ten things on your mind, and your consciousness is busy swapping intentions to let some information in, ignoring other information, and misunderstanding the next message. Your focus filter is making efficient use of your attention, or so you think, if you are aware at all.

Does your *Umwelt* for the critical instant encompass the clues you desperately need? You can't feel very confident. Just a minute ago you were as lost as a baby in the Arctic, and now there is something strange about your office.

a. Do We Know What We are Doing?

That question reverberated in the aftermath of the pedestrian bridge collapse at the Kansas City Hyatt Regency Hotel, and it tolls still. One hundred thirteen people died from it in July of 1981.

Design professionals are urged to that particular question, because the infamous changed bridge hanger detail staring at us from an orphaned shop drawing is exactly the kind of puzzle they are left at solving.

Briefly, because it is everywhere reported, the design for suspension of the two stacked pedestrian bridges called for a hanger rod passing from the building roof trusses through the floor beams of the upper bridge, where the rod was connected, and continuing through to the floor beams of the lower bridge for connection there.

Notice that the load on the upper bridge connection is the weight of the upper bridge. The load of the lower bridge is on the rod. Hold on to this: One rod means one load on the upper bridge connection, which we will call Connection "A". The lower bridge hangs on the rod and not on the upper bridge.

A steel fabricator's shop drawing was generated, which changed the design by calling for two rods. The first rod passed through the upper bridge floor beams, where it was connected, and that is Connection "A". So far just like the first design and the same upper bridge Connection "A" has exactly the load put on it by the original design-one load.

But, a second rod was started next to the rod just connected, and it was passed through the lower bridge deck beams where it was connected. Trace the load again. Now the lower bridge is connected to the upper bridge. The load that stayed in the rod on the original design was now hooked onto the upper bridge. As a consequence, there were two loads on the upper bridge Connection "A" and the bridges failed when the rod pulled through the upper bridge deck beams. That is the "Double Load" reason the bridges failed.

b. Whose *Umwelt* and How Big?

The original design was engineered by the project's structural engineer, but the shop drawing was produced by a steel fabricator, and it was not checked by the project structural engineer. You might expect a quick clear answer to, "Why not?" if you were from outside the industry. People in the profession know the answer doesn't come so quickly, and that is why the question applies, "Do we know what we are doing?"

It is the practice that steel fabricators detail connections. I think that is because people believe it saves money. It is the practice that architects and engineers check fabricators' shop drawings for general compliance with the design concept, and that check is not always done by the original project structural engineer. I think that is because people believe it saves money.

I also think it means that, in the rush and complexity of a design and construction project, there is a somebody who may not focus on the exact information needing attention in the precise way that will help. Our *Umwelten* all have different coverages. There are gaps in between, and the Golem hides in them. The size of our self-world denies our consciousness access to the signs that need reading, we miss the color of the ice, the wind confuses us, we lose our way, and the world comes down all around us. It would kill an Inuit hunter, and it kills us.

Engineers and their advisors know that design changes are a major source of uncertainty. It is a place where one party's intentions acting on a design ordered by another's intentions may well block the objectives of both. Two heads are not better than one here. The engineer, fabricator, and contractor are not in the same DC-3 design hanger, so none has ready access to the others' consciousness. Their intentions order information differently, as they are not agreed on settled goals.

The engineer, here, intended a hanger with simple, but specific load bearing characteristics, hence a one rod/one load system.

The contractor may have perceived that stringing a long rod through two bridges was cumbersome. The fabricator and contractor may both have wondered how to thread a nut at the upper bridge connection, as you can't push a nut over the unthreaded part of the rod to its middle. The shop drawing intended to answer those issues by a two rod system. Right there in the gap was a two load Connection "A", which entered no party's consciousness.

Had the information been ordered by consistent intentions acting on settled goals, construction could have been accomplished simply. Safe suspensions would have sustained life. All the two rod objectives could have been answered if the two rods had been joined together by a commonly available sleeve nut rod connector at or near Connection "A" to preserve the specific one rod/one load result intended by the engineer.

c. You Will be Blind if You Look Where the Golem is Not

You do not see the Golem unless you are looking for him-right now! When the Golem is outside your *Umwelt*, it is outside the world you know. Feel the limits here; rail bitterly against them; but the mischief is your own. Planetary leaders blind themselves by failing to anticipate the need to expand their self-worlds or by their immersion in an irrelevant field within them.

All of our empathy begs for a second chance: (1) to express at the outset that design changes order information by different intentions along goals that are not uniformly settled, (2) that changes will mask neglected risks, (3) therefore, to install a control that all proposed changes shall be personally reviewed, rejected, or approved by the original engineer in whose consciousness we expect to find the intentions that will order information in time to give us the freedom to act.

We can learn to read ice, and, if we expand our self-worlds to include reading ice when only the clues there will save us, we stand a chance at getting back home with some reliability.

Do We Bias Ourselves against the Future?

We are more likely than not to scorn people who call out our errors. They have "20-20 hindsight, " and it is easy for all to see what is apparent afterwards. Because we are all technically blind in the future, we exist in cramped empathy with people who are smacked hard by it. We are all in the same boat, I suppose, but should we be content to book passage through time with those who dare without proper preparation to affect reality for centuries?

a. Markers in the Consciousness

We are all time travelers in both directions. The past is our reservoir of experience; the future is our uncertain dominion. We travel a brief span of reality measured by the time we spend in it. No fare is collected, and no itinerary is posted.

But you are not content with that. No reason for architecture or engineering exists, unless reality is changed by it. You are a traveler in reality bent on changing it. You are not alone. Before you, travelers bent on discovery of new lands made the legends we studied and admired in school. Who did not aspire to an explorer's life?

Geographers know that exploration begins before the ship weighs anchor, and explorers never quite escape the exotic territory of the human mind. Exploration, teaches geographer J. Wreford Watson, is a process beginning in the imagination with preconceived ideas about the character and content of the lands to be found and explored. Explorers place imaginary markers on the land before one foot is set on it, and, once there, interpret what is seen to verify the markers sent conveniently ahead.

What we observe in new lands, Watson teaches, is neither new nor correct. Rather, what we see is a distortion "compounded of what men hope to find, what they look to find, how they set about finding, how findings are fitted into their existing framework of thought, and how those findings are then expressed. "

The bodies of more than a few explorers are buried in a reality more strange and harsh than the one imagined or reported by the first to arrive.

b. Claiming by Markers

We carry our reservoirs of experience forward by placing markers ahead of our actions. Design professionals look ahead to the next project, and they imprint the expected reality of it with markers from their experience. I think explorers place markers for the want of courage to meet the unfamiliar with their lives. I think it is merely expedient for us at home. It is our way of fitting new realities into the garrison of the familiar. Whether the familiar will imprison our creativity or marshal a new and finer order depends on the preparation of our consciousness in that exact instance.

If we send our imaginary markers, as Watson would warn us, compounded by what we hope to find, what we have decided to find, what within our existing framework of thought we are prepared to find, then, we will not claim new territory.

There is no conclusive trepidation in that. The essential and cheerful point is that we can distinguish reality from our imaginary markers. The garrison of our experience will not acquit our comfortable conjecture if the consciousness is prepared to discover and reject all counterfeit reality.

PUTTING THE PARADIGM IN MOTION:

LEARNING TO SEE

What exceptional powers have the complex and wonderfully adaptable beings that we are. But how timid and awkward do we approach our potential. We are hunters who turn prey at our own hands. We build our own versions of a human consciousness by inventing our self, our self-worlds. To our great dismay, we do not always build wisely, and our maintenance can be shabby at best.

The Self Estate

If I have occasionally made the self sound troublesome, dispatch that notion. Thomas Edison said he grew tired of hearing people run down the future, as he intended to spend the rest of his life in it. Your time in the future is in the self and the consciousness you construct. You have need of a strong and orderly estate.

The self has been much theorized, amplified, anesthetized, and penalized in philosophy, science, and society. We humans seem at times astonished at our capabilities and, alternatively, fearful of our potential. You may study the books yourself and draw your own conclusions about which ideology's sound you favor.

We bark for no dogma here. We look instead for what will help us increase our freedom to act. For it is the freedom to act that powers the quality paradigm.

To command that freedom, we need to know what labor our consciousness performs, collect the sweat of it on our faces, and feel its exertions as experience. We need to conserve our values and tie goals and controls in harmony with them. We need to chart the limits of our *Umwelt*, feel the weight of information and give good measure in it, and know the dysfunctions that inhibit our performance. Plainly, we will never complete the task of mastering all of that, but we can open our consciousness to secret possibilities and make at least a few breathtaking leaps through reality.

a. Splendorous Estates

Ours is first among all species for the time and energy spent in preparation, and our aspirations have propelled a pace of change that may predestine us all to a constant state of refitting. That would be a fine destiny, indeed, one well suited for planetary leaders. It is entirely suitable for any person bent on changing the planetary reality, even by adjusting a corner of it on Main Street.

The point here acknowledges but moves across your constant technical preparation: The point lands in your private estate. There, you are made guardian of your values and goals, and you determine the paths you will follow; there, you install controls on your progress along settled paths; there, you experiment with immortality, and you plan to change reality, perhaps forever.

Do you marvel at the splendorous potential of your private estate? Look at the rooms, the library shelves, secret passages, doors to cryptic codes unbroken, and the plans, dreams, the flying machines! No one

else has an estate quite like it! It is no wonder Strauss has appeared suddenly to conduct *Also Sprach Zarathustra* just for you!

Tell us Guardian: What will you build from all that wonderment in our shared reality? Concentrate! Strauss is on tiptoes; poised, baton waved high; the music soars here! This is your moment: Yours is the next breathtaking leap into reality leaving changes in stone, steel, and glass, perhaps forever! The doors to your estate fly open; the light from a billion possibilities is brilliant, but the music fails, it fades, and a critic looks back on you from your own shoulder. You can't stop it. Reality is sobering; there are doubts in the approach to it, and there ought rightfully to be. Reality is, finally, a splendid place only for the people who are first prepared to leave their private estates and earn a place in it.

b. The Concern of Self

There is no single way of preparation, but none will escape the need to travel paths in that direction. I offer you a recommendation from my time spent visiting disappointed estates and on the grounds outside fitting back the pieces of broken realities.

The classical Greeks postulated a self that held but the promise of attaining credentials fit to affect reality. The promise would be unfulfilled unless the individual undertook the obligation to prepare and care for the self that it would be made and remain qualified to venture into reality. The guiding, early Greek principle was, "Take care of yourself. " Scholars teach that meant that you were to undertake the care of yourself as a central obligation. The philosophy obligated the individual to take guardianship over the self estate.

To accomplish your care, you were necessarily required to see yourself as a figure of some central importance. Over time, that Greek principle got into the same kind of trouble the Sun had at the center of the solar system, and both lost ground in the fierce competition for the heart of mankind's proper concern.

"Take care of yourself " and its corollary, "The concern of self, " gave ground to the more accommodating, *gnothi sauton*, or "Know yourself. " Scholars teach that "Know yourself " had a different point: It was ecclesiastical advice of the time meaning, "Do not presume yourself to be a god. "

Good advice for this time of day, as well. But, as the Sun was restored to a working position in the solar system, perhaps we may find useful employment in our time for the Greek concern with the self.

Askesis Back to the Future

The philosophy has technique. *Askesis* is a discipline to prepare the novice human being for reality. The techniques of *askesis* train the self. In the Greek, the objective pursued is *paraskeuazo*, "to get prepared. " While adrift in a neophyte consciousness, you know neither yourself, nor do you know reality. You are unprepared to take your place in reality. But you become prepared by the acquisition and assimilation of the truth about yourself and about reality. All of that is knowledge necessary for you to take care of yourself.

Do not draw the conclusion that the concern with self can be called self-centered as we use the term today. *Askesis* sought to train the ethical self. Its training led to the assimilation of truth, and its practice tested one's preparation for doing what should be done when confronted with reality. The first note of the paradigm, the value note, is everywhere evident in the *askesis*. Greece was to get a healthy Republic out of the healthful self.

a. The First Discipline *Melete*: The *Premeditatio Mallorum*

The *askesis* is a philosophical tradition in two parts. The first part is *melete* in the Greek or *meditatio* in the Latin.

Melete is the progressive consideration of the self performed by contemplating anticipated situations, then engaging in a dialogue of useful responses, arguments, and courses of action. The *meditatio* is a "what if-then this" inquest of the self. Accomplished alone, it is a meditation; with another, it is Socratic exchange:

I foresee something. What will you do?

I will do this. Why?

Because it will do some good. But, is that enough?

I believe it is. But, I foresee something else.

And on it goes.

The *meditatio* is especially commended to judgment workers, whose thoughts (unlike ball bearings) cannot be readily measured and whose flaws, if not detected by themselves, may be unperceived by others. Judgment workers are the guardians of their own values and goals, but they are fiduciaries of precious parts of the reality we all share. Before our shared reality is changed forever by what is put there, people who bend it by their intentions should test the consequences first on themselves. You do not need more examples of that.

Those who pursue the classic, *premeditatio mallorum*, pursue training of the ethical self. It is preparation that increases the freedom to act by forcing upon us images of the future misfortunes we will wish to avoid. It teaches us to see the Golem.

The discipline develops three eidetic (cinagraphic) reductions of future misfortune:

FIRST: Imagine your future, not as you believe it will be, but imagine the worst that can happen in your future. Do not temper the images with what "might be" or "how it happened once before," but make the worst case imaginable for yourself.

SECOND: Imagine not that this will happen in the future, but that it is in the process of happening now. Imagine not that the shop drawing will change the design, but that the shop drawing is being drawn, that

it has been drawn, that the steel is being fabricated, that the steel is being installed, that the building is occupied, that the connection has failed.

THIRD: Engage in a dialogue to prepare your responses and actions, until you have reduced the cinegraph to an ethical resolution. Do not conclude the dialogue until you are prepared to do what should be done when faced with the reality of what you have imagined.

Herein are tested the responses: I am not responsible for changes; someone else is responsible; they are supposed to tell me about any changes first and send me calculations; they are engineers, too; I wasn't hired for steel detailing; my review is only for general, not specific compliance; I look at every steel shop drawing they send me; there is only so much time and money for shop drawing reviews; the building department approved the building; I did what others would have done.

Common precautions and plans may not allow an eidetic reduction of your future misfortune that can conserve your values and meet your goals. Perhaps, what you are about is not common, or, if common, it holds peril for many lives. Then, try repeated reductions with new precautions until a satisfactory resolution is achieved. This can be unsettling work, but harness the agitation you feel. It is an antagonist you call voluntarily to your cause. Feel the weight of that critic on your shoulder.

People unwilling to deliberately disquiet themselves will refuse the proportions of a future misfortune or will dismiss it for an uncertainty of occurrence, but that is not an eidetic reduction. That is denial, and denial is not preparation.

When you are prepared to affect reality, you will see the Golem, and you will be prepared to do what must be done. Your preparation will reveal the Golem wrapped in the twisted metal moment you cease conservation of your values.

What you are permitted to access by the discipline is an unacceptable reality at no loss to life or property. It is an opportunity to check your values, settle your goals, install controls, and prepare yourself (including the potent set) with the intentions that will order and encode information and instruct actions thereafter to reduce future misfortune.

As the result of living the *premeditatio mallorum*, a structural engineer might decide to review a steel shop drawing for each and every load-bearing connection in a suspension bridge, which he will check off on the structural sheets one by one.

A design professional could discover that stacked, suspended, pedestrian bridge designs carry significant missing information and make the decision to increase the probability of the information furnished achieving the intended outcome. Drawings and specifications might encode copious redundant information to limit the possible outcomes. That might be done even for the absurdly simple design, because the consequences of a failure are too great to risk. Perhaps, the eidetic reduction of future misfortune can be handled in no other way.

With this preparation, ice can be read and understood, and hunters will return to their families.

b. The Second Discipline *Gymnasia*: To Train

Melete is work in the imagination, and it prepares one to affect reality by fortifying the consciousness with information about intentions, anticipations, and future misfortunes. *Gymnasia* is work at the other end of the spectrum, where there is training in real situations.

Training, as I believe you know, is not what is done in school. Students go to college to study for the same reason people go to banks for robbery. Money is kept in banks, and college is where theory is kept.

If done at all, training is begun and continued in practicing firms actively affecting reality. New practitioners, if ready to work, are not prepared to affect reality. *Gymnasia* contemplates that training will be in real situations, even if they do not directly affect reality. That is one function of reviews by seniors and making experienced minds available to curious beginners. It is the business of finding and sustaining curiosity. *Gymnasia* teaches the *premeditatio mallorum* to give the novice a view, even if pessimistic, of the reality as it might be for a slow or careless apprentice.

Take note that people who do not train at the *premeditatio* "if this-then what? " are frequently seen playing at the less effective self-care exercise, "If only we had-well then. "

THE CASE FOR OPTIMISM

There are hard lessons for us and much work undone here, but even as we sit among the broken dreams and scattered flying machines, the case for optimism is at hand.

Which Path is Chosen: Whose Fields are Crossed?

Much stock is put in the individual here. Have you asked yourself what was done to teamwork along the way? Teamwork was not buried here. I think it was improved. People who are individually prepared for quality results are both candidates for leadership and worthy contributors to a team aiming in that direction. Prepared individuals can settle on team goals and the paths to them. They are more confident of their attainment, because they are individually and intelligently committed to the goals and paths traveled.

The ideology of the submerged individual slogging along to forced songs fades now. The *Internationale* does not muffle the cries of people who will not bear repression. The fierce focus on the competition between ideologies is fading. You can read Winter and worry on the faces of the remaining ideologues. The immediate season is entrepreneurial Spring. And you can foresee the doors to profound optimism opening there on more hinges of consciousness free to act than ever before. The good of that is the better work our species does under those conditions.

Abraham Lincoln knew that when he mused in a diary in 1861 on the success of the American experiment with the individual's freedom:

Without the Constitution and the Union, we could not have attained the result; but even these, are not the primary cause of our great prosperity. There is something back of these, entwining itself more closely about the human heart. That something, is the principle of "Liberty to all "-the principle that clears the *path* for all-gives *hope* to all-and, by consequence, *enterprise*, and *industry* to all.

Basler, ed., *Collected Works of Abraham Lincoln, IV*, 168-69.

The paradigm led to Greek philosophy and now to Mr. Lincoln by tracing the lineage of its subject. You have been our subject. When the path chosen starts there, its course passes through a philosophy that would put a piece of the Republic's fate in your estate and make you its guardian. We stand on good ground with that, because quality comes from there.

Judgment Workers on the Path to Enterprise

The attention to individuals and their achievements has given us insights into how some people get into step with the choreography of quality.

Psychologists and researchers in this relatively new field have offered observations about the highest achievers:

1. They are able to transcend previous comfort zones, thereby opening themselves to new heights of achievement.
2. They are guided by compelling goals they set themselves.
3. They solve problems rather than place blame.
4. They confidently take risks after preparing their psyche for the worst consequences, and they are able to mentally rehearse anticipated actions or events beforehand.
5. They routinely issue "Catastrophic Expectations Reports" to themselves, against which they refine and rehearse countermeasures.
6. They are able to imagine themselves exceeding previous achievements, and they issue themselves "Blue Sky Reports. "
7. They do what they do for the art and beauty of accomplishment.

There are other attributes of high achievers, I am sure, but this list is a fair mirror to reflect in.

As you reflect, return to the *askesis* to test the durability of its traditions, and consider (with a nod to Mr. Lincoln's own reading list) whether the Greeks of antiquity were not correct after all to care for the self that the Republic might enjoy great health.

Carry What You Think Will Last

I hope you read more philosophy and art in the paradigm than procedure, for, unless you do, no good may come of it.

Managers, who, by this time, may wonder how to get their judgment workers to rendezvous with quality, are about to walk away from the philosophy of it altogether. The paradigm has space for all, but it has no separate rooms. Everyone must look to the care of the self that the firm may prosper. No one has permission to go blindly and unprepared into the reality of the next project. Not from the leading principal to the neophyte is anyone exempt from preparation to figure the probability of missing information and give good weight in it, to test false markers, or to lay first eye on the Golem.

The philosophy of the paradigm is in the pursuit of quality as an ethical odyssey. Those who achieve and sustain high quality are in that chase.

The art of it is in the happiness men and women attain from the work of architecture and engineering when they are prepared to affect reality in a way that has timeless beauty.

Paper Tigers

What place is there for the procedures, the checklists, and the standards that are the common mainstay of quality management?

Yes, paper and recordings on it are required. But the purpose of all that paper is not to drive workers to quality goals. Rather, its purpose is to record the experience the firm has had in successfully affecting reality, and to communicate the wisdom gained. It is history; therefore, it can be guidance, and I like that. It is yesterday's news, and that worries me.

That paper tools are made is not assurance that any user is alive to the hazards. Airlines believe in doing things by the book; pilots believe in doing things by the book; both mostly do. Yet wings are still ice coated and flaps set in wrong positions, and both occasionally stay that way right through the crash.

I said earlier that controls are deliberate potentials for disquieting information, but what I know about checklists is that people frequently bounce through them seeking confirmation (or more likely, just documentation) that they have done right. None of that helps us return home from the hunt safely.

The Inuit hunter learns the clues in ice for the love of life in him. Clues that have immense potential are not missed; they are immediate, intimate, and they solve the mystery of survival. You and I lose nearly every bit of the good in the paper tools we read. We are not disquieted, and we do not allow controls to make us deliberately so.

The clues in paper tools will have immense potential only for people intent on their preparation for changing reality. People in that chase will compose their histories in comprehensive and precise checklists, procedures, and standards, and they will send them ahead armed with their tested insights of the perils in new projects. They will offer them for wisdom that is immediate, intimate and for their potential to solve mysteries in stone, steel, and glass. But they will not cast confident eyes over their paper tools. The quality is not in them.

Last Words

We went looking for the roots of our failures and for any help there was to comprehend passages back from deep disappointment. I think we hoped to emerge with clues to our happiness.

It turned out there were all around us everywhere waiting, clues.

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For a discourse on evolution of species, you cannot do better than Richard Dawkins' book, *The Blind Watchmaker*, W.W. Norton & Company, 1986. Mr. Dawkins offers for ten dollars to sell you his Macintosh "Biomorph " program, which will have you evolving on-screen life forms in minutes. See the coupon in the back of his book. As far as I know, it is the only way to get the program.

Peter F. Drucker is frequently your best source and often the only one you will need on management theory, including goals, controls, and the behavior of workers in an information era. *Management Tasks, Responsibilities, Practices*, Harper & Row, 1973, is comprehensive.

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