

ORGANIC DESIGN

ORGANIC DESIGN
for
COMMAND AND CONTROL

May 1987

John R. Byrd

THE TITLE CHART PROVOKES A COUPLE QUESTIONS:

- Why the focus on C&C?
- What do we mean by organic design?

FAILURES

The past few years have seen the fiascos associated with Nifty-Nugget and Proud Spirit C&C exercises together with the real world fiascos epitomized by the evacuation of Saigon, Desert I and others.

RESPONSE

The institutional response for overcoming these fiascos is: more and better sensors, more communications, more and better computers, more and better display devices, more satellites, more and better fusion centers, etc.--all tied into one giant fully informed, fully capable C&C system. This way of thinking emphasizes hardware as the solution.

ANOTHER WAY

I think there is a different way--a way that emphasizes the implicit nature of human beings. In this sense, the following discussion will uncover what we mean by both implicit nature and organic design.

IMPLICATIONS

- Need insight and vision, to unveil adversary plans and actions as well as "foresee" own goals and appropriate plans and actions.
- Need focus and direction, to achieve some goal or aim.
- Need adaptability, to cope with uncertain and everchanging circumstances.
- Need security, to remain unpredictable.

ELABORATION

- Why insight and vision? Without insight and vision there can be no orientation to deal with both present and future.
- Why focus and direction? Without focus and direction, implied or explicit, there can be neither harmony of effort nor initiative for vigorous effort.
- Why adaptability? Adaptability implies variety and rapidity. Without variety and rapidity one can neither be unpredictable nor cope with changing and unforeseen circumstances.
- Why security? Without security one becomes predictable, hence one loses the benefits of the above.

COMMENT

With these thoughts in mind let's take a look at some appropriate samples from the historical environment that will, as we shall see, prove useful before trying to evolve any operational philosophy or command and control concept.

SAMPLES FROM HISTORICAL ENVIRONMENT

- Sun Tzu (around 400 BC)

Probe enemy to unmask his strengths, weaknesses, patterns of movement and intentions. Shape enemy's perception of world to manipulate/undermine his plans and actions. Employ Cheng/Ch'i maneuvers to quickly and unexpectedly hurl strength against weaknesses.

- Bourcet (1764-71)

"A plan ought to have several branches. ...One should...mislead the enemy and make him imagine that the main effort is coming at some other part. And...one must be ready to profit by a second or third branch of the plan without giving one's enemy time to consider it."

- Napoleon (early 1800's)

"Strategy is the art of making use of time and space. I am less chary of the latter than the former. Space we can recover, time never. ...I may lose a battle, but I shall never lose a minute. The whole art of war consists in a well reasoned and circumspect defensive, followed by rapid and audacious attack."

- Clausewitz (1832)

Friction (which includes the interaction of many factors, such as uncertainty, psychological/moral forces and effects, etc.) impedes activity. "Friction is the only concept that more or less corresponds to the factors that distinguish real war from war on paper." In this sense, friction represents the climate or atmosphere of war.

- Jomini (1836)

By free and rapid movements carry bulk of the forces (successively) against fractions of the enemy.

SAMPLES FROM HISTORICAL ENVIRONMENT (Continued)

- N.B. Forrest (1860's)

"Git thar the fustest with the mostest."

- Blumentritt (1947)

"The entire operational and tactical leadership method hinged upon...rapid, concise assessment of situations,...quick decisions and quick execution, on the principle: 'each minute ahead of the enemy is an advantage.'"

- Balck (1980)

Emphasis upon creation of implicit connections or bonds based upon trust, not mistrust, that permit wide freedom for subordinates to exercise imagination and initiative--yet, harmonize within intent of superior commanders. Benefit: internal simplicity that permits rapid adaptability.

- Yours Truly

Operate inside adversary's observation-orientation-decision-action loops to enmesh adversary in a world of uncertainty, doubt, mistrust, confusion, disorder, fear, panic chaos,...and/or fold adversary back inside himself so that he cannot cope with events/efforts as they unfold.

KEY POINTS

- The atmosphere of war is friction.
- Friction is generated and magnified by menace, ambiguity, deception, rapidity, uncertainty, mistrust, etc.
- Friction is diminished by implicit understanding, trust, cooperation, simplicity, focus, etc.
- In this sense, variety and rapidity tend to magnify friction, while harmony and initiative tend to diminish friction.

IN OTHER WORDS

- Variety/rapidity without harmony/initiative lead to confusion, disorder and ultimately to chaos.

on the other hand

- Harmony/initiative without variety/rapidity lead to (rigid) uniformity, predictability and ultimately to non-adaptability.

? - RAISES THE QUESTION - ?

- How do we generate harmony/initiative so that we can exploit variety/rapidity?

COMMENT

- We must uncover those interactions that foster harmony and initiative--yet do not destroy variety and rapidity.

INTERACTIONS

Positive

Activities

- Radio transmission/reception
- Conversation/writing
- Operational Intelligence Center
- Teamwork
- Tradeoffs
- Hans Rudel

Linkages

- Common frequencies
- Common language
- Correlation among multiple sources
- Harmony of different efforts
- Inversely related characteristics
- Image of activities and changes thereto

Negative

- Compartmentation
- Non-cooperative centers of gravity
- Alienation
- Non-adaptation
- Fixed recipe

- Disconnected bits and pieces
- Islands of disconnected effort
- Disconnected from other humans
- Disconnected from environment
- Disconnected from environment, but connected to some formality

INSIGHT

Interactions, as shown, represent a many-sided implicit cross-referencing process of projection, empathy, correlation, and rejection.

SUSPICION

Seems as though this insight is related in some way to orientation, hence it...

? - RAISES THE QUESTION - ?

What do we mean by orientation?

MESSAGE

Orientation, seen as a result, represents images, views, or impressions of the world shaped by genetic heritage, cultural tradition, previous experiences, and unfolding circumstances.

? - RAISES ANOTHER QUESTION - ?

How are these images, views, or impressions created?

MESSAGE

Referring back to our previous discussion, we can say: orientation is an interactive process of many-sided implicit cross-referencing projections, empathies, correlations, and rejections that is shaped by and shapes the interplay of genetic heritage, cultural tradition, previous experiences, and unfolding circumstances.

ILLUMINATION

- Orientation is the schwerpunkt. It shapes the way we interact with the environment--hence orientation shapes the way we observe, the way we decide, the way we act.

In this sense

- Orientation shapes the character of present observation-orientation-decision-action loops--while these present loops shape the character of future orientation.

IMPLICATION

- We need to create mental images, views, or impressions, hence patterns that match with activity of world.
- We need to deny adversary the possibility of uncovering or discerning patterns that match our activity, or other aspects of reality in the world.

ESSENTIAL IDEA

Patterns (hence, orientation), right or wrong or lack thereof, suggest ability or inability to conduct many-sided implicit cross-references.

? - RAISES QUESTION - ?

How do we set-up and take advantage of the many-sided implicit cross-referencing process of projection, empathy, correlation, rejection that make appropriate orientation possible?

MESSAGE

Expose individuals, with different skills and abilities, against a variety of situations--whereby each individual can observe and orient himself simultaneously to the others and to the variety of changing situations.

? - WHY - ?

In such an environment, a harmony, or focus and direction, in operations is created by the bonds of implicit communications and trust that evolve as a consequence of the similar mental images or impressions each individual creates and commits to memory by repeatedly sharing the same variety of experiences in the same ways.

BENEFICIAL PAYOFF

A command and control system, whose secret lies in what's unstated or not communicated to one another (in an explicit sense)--in order to exploit lower-level initiative yet realize higher-level intent, thereby diminish friction and compress time, hence gain both quickness and security.

2 - RAISES QUESTION - 2

What happens if we cannot establish these implicit connections or bonds--via similar mental images or impressions--as basis to cope with a many-sided uncertain and everchanging environment?

ILLUMINATION

- The previous discussion assumes interaction with both the external and internal environment. Now, let us assume, for whatever reason or combination of circumstances, that we design a command and control system that hinders interaction with external environment. This implies a focus inward, rather than outward.
- Picking up on this idea, we observe from Darwin that:
 - The environment selects.
 - Ability or inability to interact and adapt to exigencies of environment select one in or out.
- Furthermore, according to the Godel Proof, the Heisenberg Uncertainty Principle, and the Second Law of Thermodynamics:
 - One cannot determine the character or nature of a system within itself.
 - Moreover, attempts to do so lead to confusion and disorder. Why? Because in the "real world" the environment intrudes (my view).
- Now, by applying the ideas of Darwin, the Second Law, Heisenberg, and Godel to Clausewitz one can see that:

He who can generate many non-cooperative centers of gravity magnifies friction. Why? Many non-cooperative centers of gravity within a system restrict interaction and adaptability of system with its surroundings, thereby leading to a focus inward (i.e., within itself), which in turn generates confusion and disorder, which impedes vigorous or directed activity, hence, by definition, magnifies friction or entropy.

POINT

- Any command and control system that forces adherents to look inward, leads to dissolution/disintegration (i.e., system comes unglued).

IN A MUCH LARGER SENSE

- Without the implicit bonds or connections, associated with similar images or impressions, there can be neither harmony nor individual initiative within a collective entity, therefore, no way that such an organic whole can stay together and cope with a many-sided uncertain and everchanging environment.

or equivalently

- Without implicit bonds or connections, we magnify friction, produce paralysis, and get system collapse.

INSIGHT

The key idea is to emphasize implicit over explicit in order to gain a favorable mismatch in friction and time (i.e, ours lower than any adversary) for superiority in shaping and adapting to circumstances.

? - RAISES QUESTION - ?

How do we do this?

MESSAGE

- Suppress tendency to build-up explicit internal arrangements that hinder interaction with external world.

Instead

- Arrange setting and circumstances so that leaders and subordinates alike are given opportunity to continuously interact with external world, and with each other, in order to more quickly make many-sided implicit cross-referencing projections, empathies, correlations, and rejections as well as create the similar images or impressions, hence a similar implicit orientation, needed to form an organic whole.

Why?

- A similar implicit orientation for commanders and subordinates alike will allow them to:
 - Diminish their friction and reduce time, thereby permit them to:
 - Exploit variety/rapidity while maintaining harmony/initiative, thereby permit them to:
 - Get inside adversary's O-O-D-A loops, thereby:
 - Magnify adversary's friction and stretch-out his time (for a favorable mismatch in friction and time), thereby:
 - Deny adversary the opportunity to cope with events/efforts as they unfold.

CIRCLING BACK TO THE BEGINNING

- We can see that implicit orientation shapes the character of:
 - Insight and Vision
 - Focus and Direction
 - Adaptability
 - Security

IMPLICATION

- Since a first rate command and control system should possess above qualities, any design or related operational methods should play to and expand, not play down and diminish, implicit orientation.

COMMENT

Up to this point we have shown orientation as being a critical element in command and control--implying that without orientation there is no command and control worthy of the name.

VERY NICE

But, simply stated, what does this comment and everything else we've discussed so far tell us about command and control?

ILLUMINATION

- The process of observation-orientation-decision-action represents what takes place during the command and control process--which means that the O-O-D-A loop can be thought of as being the C&C loop.
- The second O, orientation--as the repository of our genetic heritage, cultural tradition, and previous experiences--is the most important part of the O-O-D-A loop since it shapes the way we observe, the way we decide, the way we act.

IMPLICATION

- Operating inside adversary's O-O-D-A loop means the same thing as operating inside adversary's C&C loop.

WHICH
? - RAISES THE QUESTION - ?

How can we get effective command and control?

SOME HISTORICAL SNAPSHOTS

In responding to this question let us take a look at some evidence (provided by Martin Van Creveld as well as myself) that may help in this regard:

- Napoleon's use of staff officers for personal reconnaissance
- Moltke's message "directives" of few words
- British tight control at the Battle of the Somme in 1916
- British GHQ "phantom" recce regiment in WW II
- Patton's "household cavalry"
- My use of "legal eagle" and comptroller at NKP.

A RICHER VIEW
(a la Martin Van Creveld--"Command"--1982)

In the June 1967 War, "...General Yashayahu Gavish spent most of his time either 'accompanying' units down to brigade level--by which, according to his own definition, he meant staying at that unit's command post and observing developments at first hand--or else helicoptering from one unit to another; again, in his own words, 'there is no alternative to looking into a subordinate's eyes, listening to his tone of voice'. Other sources of information at his disposal included the usual reporting system; a radio network linking him with three divisional commanders, which also served to link those commanders with each other; a signals staff whose task it was to listen in to the divisional communications networks, working around the clock and reporting to Gavish in writing; messages passed from the rear, i.e., from General Headquarters in Tel Aviv, linked to Gavish by 'private' radiotelephone circuit; and the results of air reconnaissance forwarded by the Air Force and processed by Rear Headquarters. Gavish did not depend on these sources exclusively, however; not only did he spend some time personally listening in to the radio networks of subordinate units (on one occasion, Gavish says, he was thereby able to correct an 'entirely false' impression of the battle being formed at Brigadier Gonen's headquarters) but he also had a 'directed telescope' in the form of elements of his staff, mounted on half tracks, following in the wake of the two northernmost divisions and constantly reporting on developments."

POINT

The previous discussion once again reveals our old friend--the many-sided implicit cross-referencing process of projection, empathy, correlation, and rejection.

2 - RAISES QUESTION - 2

Where does this lead us?

EPITOME OF "COMMAND AND CONTROL"

Nature

- Command and control must permit one to direct and shape what is to be done as well as permit one to modify that direction and shaping by assessing what is being done.

What does this mean?

- Command must give direction in terms of what is to be done in a clear unambiguous way. In this sense, command must interact with system to shape the character or nature of that system in order to realize what is to be done;

whereas

- Control must provide assessment of what is being done also in a clear unambiguous way. In this sense, control must not interact nor interfere with system but must ascertain (not shape) the character/nature of what is being done.

Implication

- Direction and shaping, hence "command", should be evident while assessment and ascertainment, hence "control", should be invisible and should not interfere--otherwise "command and control" does not exist as an effective means to improve our fitness to shape and cope with unfolding circumstances.

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- Control must provide assessment of what is being done also in a clear unambiguous way. In this sense, control must not interact nor interfere with system but must determine (not shape) the character/nature of what is being done.

Implication

- Direction and shaping, hence "command", should be evident while assessment and determination, hence "control", should be invisible and should not interfere--otherwise "command and control" does not exist as an effective means to improve our fitness to shape and cope with unfolding circumstances.

ILLUMINATION

- Reflection upon the statements associated with the Epitome of "Command and Control" leave one unsettled as to the accuracy of these statements. Why? Command, by definition, means to direct, order, or compel while control means to regulate, restrain, or hold to a certain standard as well as to direct or command.
- Against these standards it seems that the command and control (C&C) we are speaking of is different than the kind that is being applied. In this sense, the C&C we are speaking of seems more closely aligned to leadership (rather than command) and to some kind of monitoring ability (rather than control) that permits leadership to be effective.
- In other words, leadership with monitoring, rather than C&C, seems to be a better way to cope with the multi-faceted aspects of uncertainty, change, and stress. On the other hand, monitoring, per se, does not appear to be an adequate substitute for control. Instead, after some sorting and reflection, the idea of appreciation seems better. Why? First of all, appreciation includes the recognition of worth or value and the idea of clear perception as well as the ability to monitor. Moreover, next, it is difficult to believe that leadership can even exist without appreciation.
- Pulling these threads together suggests that appreciation and leadership offer a more appropriate and richer means than C&C for shaping and adapting to circumstances.

? - RAISES QUESTION - ?

Where does this lead us?

APPRECIATION AND LEADERSHIP

Nature

- Appreciation and leadership must permit one to discern, direct and shape what is to be done as well as permit one to modify the direction and shaping by assessing what is being done or about to be done (by friendlies as well as adversaries).

What does this mean?

- Appreciation, as part of leadership, must provide assessment of what is being done in a clear unambiguous way. In this sense, appreciation must not interact nor interfere with system but must discern (not shape) the character/nature of what is being done or about to be done;

whereas

- Leadership must give direction in terms of what is to be done also in a clear unambiguous way. In this sense, leadership must interact with system to shape the character or nature of that system in order to realize what is to be done.

Implication

- Assessment and discernment should be invisible and should not interfere with operations while direction and shaping should be evident to system--otherwise appreciation and leadership do not exist as an effective means to improve our fitness to shape and cope with unfolding circumstances.

SUSPICION

The previous discussion suggests that the title "Organic Design for Command and Control" is not appropriate.

? - WHY - ?

C&C represents a top-down mentality applied in a rigid or mechanical (or electrical) way that ignores as well as stifles the implicit nature of human beings to deal with uncertainty, change, and stress. (Examples: The Battle of the Somme, Evacuation of Saigon, Mayaguez Affair, Desert I, Nifty-Nugget and Proud Spirit C&C exercises, etc.).

RESOLUTION

With these thoughts in mind, I suggest that the following title more clearly reflects the spirit and content of this presentation.

APPRECIATION AND LEADERSHIP

DEFINITIONS

- Understanding - means to comprehend or apprehend the import or meaning of something.
- Command - refers to the ability to direct, order, compel with or without authority or power.
- Control - means to have power or authority to regulate, restrain, verify, (usually against some standard) direct or command. Comes from medieval latin contrarotulus, a "counter roll" or checklist (contra, against plus rotulus, list).
- Monitoring - refers to the process that permits one to oversee, listen, observe, or keep track of as well as to advise, warn, or admonish.
- Appreciation - refers to the recognition of worth or value, clear perception, understanding, comprehension, discernment, etc.
- Leadership - implies the art of inspiring people to enthusiastically take action toward the achievement of uncommon goals.

STRATEGIC GAME

THE STRATEGIC GAME

OF

? AND ?

June 1987

John R. Beal

? - RAISES QUESTION - ?

What lies hidden under the question marks?

PUT SIMPLY

That is what the aim or purpose of this presentation is all about--to find and make evident what lies hidden under the question marks!

FOR OPENERS

What is Strategy?

OUTLINE

- What is Strategy?
- What is the aim or purpose of strategy?
- What is the central theme and what are the key ideas that underlie strategy?
- How do we play to this theme and activate these ideas?

APPROACH

- Make a general Survey
- Condense to Essential Elements
- Place in Strategic Perspective
- Implementation

? - RAISES QUESTION - ?

Why do we want to use this approach?

ILLUSTRATION

- Imagine that you are on a ski slope with other skiers--retain this image.
- Imagine that you are in Florida riding in an outboard motorboat--maybe even towing waterskiers--retain this image.
- Imagine that you are riding a bicycle on a nice spring day--retain this image.
- Imagine that you are a parent taking your son to a department store and that you notice he is fascinated by the toy tractors or tanks with rubber caterpillar treads--retain this image.

NOW IMAGINE THAT YOU:

- Pull skis off ski slope; discard and forget rest of image.
- Pull outboard motor out of motorboat; discard and forget rest of image.
- Pull handlebars off bicycle; discard and forget rest of image.
- Pull rubber treads off toy tractors or tanks; discard and forget rest of image.

THIS LEAVES US WITH

Skis, outboard motor, handlebars, rubber treads

PULLING ALL THIS TOGETHER

What do we have?

SNOWMOBILE

? - WHAT DOES THIS EXAMPLE SUGGEST - ?

To discern what is going on we must interact in a variety of ways with our environment.

IN OTHER WORDS

We must be able to examine the world from a number of perspectives so that we can generate mental images or impressions that correspond to that world.

MORE TO THE POINT

We will use this scheme of pulling things apart (analysis) and putting them back together (synthesis) in new combinations to find how apparently unrelated ideas and actions can be related to one another.

GENERAL SURVEY

DISCIPLINES OR ACTIVITIES TO BE EXAMINED

- Mathematical Logic
- Physics
- Thermodynamics
- Biology
- Psychology
- Anthropology
- Conflict

VERY NICE

BUT

? - WHERE DO WE BEGIN - ?

HUMAN NATURE

Goal

- Survive, survive on own terms, or improve our capacity for independent action.

The competition for limited
resources to satisfy these
desires may force one to:

- Diminish adversary's capacity for independent action, or deny him the opportunity to survive on his terms, or make it impossible for him to survive at all.

? - RAISES THE QUESTION - ?

In a most fundamental way how do we realize this goal or make it difficult for others to realize this goal?

SELECTIONS FROM NEWSPAPERS

The Washington Post

"Nerve Cells Redo Wiring...", by Boyce Rensberger

"Dale Purvis and Robert D. Hadley...have discovered that a neuron's fibers can change significantly in a few days or weeks, presumably in response to changing demands on the nervous system. ...research has shown neurons continually rewire their own circuitry, sprouting new fibers that reach out to make contact with new groups of other neurons and withdrawing old fibers from previous contacts... This rewiring process may account for how the brain improves one's abilities such as becoming proficient in a sport or learning to play a musical instrument. Some scientists have suggested that the brain may use this method to store facts. ...The research was on adult mice, but since all mammalian nervous systems appear to behave in similar ways, the researchers assume that the findings also apply to human beings."

The Washington Post Book World

"The Soul of the Machine", by Richard M. Restak (Review of "Neuronal Man", by Jean-Pierre Changeux)

"Changeux suggests that the complexity of the human brain is dependent upon the vast number of synapses (connections) between brain cells. ...these synaptic connections are established or fall by the wayside according to how frequent they're used. Those synapses which are in frequent use tend to endure ('are stabilized') while others are eliminated... In other words,...interactions with the environment"...[exert]..."tremendous influence on the way the human brain works and how it has evolved."

SELECTIONS FROM NEWSPAPERS (Continued)

The Washington Post

"Brain Cells Try To Battle Alzheimer's...", by Jan Ziegler

"A post mortem study of brains of Alzheimer's victims", (reported on by Dr. Carl Cotman and colleagues) "showed that cells tried to repair connections destroyed by the disease by sprouting new branches,... A progressive, degenerative disease, it can cause memory loss, confusion, difficulty in speech and movement, inability to recognize even family members... A characteristic of the disease is the death of neurons, or nerve cells, that connect to each other by long fibers, which forces the brain to live with fewer and fewer connections. Analyzing cells from the hippocampus of six deceased Alzheimer's patients, Cotman and colleagues, found that axons--the output fibers of nerve cells, responsible for transmitting signals through the nervous system--start to sprout, reforming the connections between remaining cells... Ultimately however, the sprouting process cannot keep up with destruction. Either the sprouting stops, or too many nerve cells die..."

Erie Daily Times

"Rats Lost Muscle, Bone Strength in Space Flight", by Paul Recer

"Space rats that spent seven days in orbit suffered massive losses of muscle and bone strength, suggesting that astronauts on long voyages must be protected from debilitating effects of zero gravity... The young space rats experienced a bone strength loss of up to 45 percent and a muscle tissue loss of up to 40 percent...older rats...suffered bone and muscle strength losses of about 15 percent... Soviet space scientists reported a similar amount of muscle and bone loss in rats that were in space for more than 20 days..."

SELECTIONS FROM BOOKS

"Order Out of Chaos", by Ilya Prigogine and Isabelle Stengers

"Equilibrium thermodynamics provides a satisfactory explanation for a vast number of physicochemical phenomena. Yet it may be asked whether the concept of equilibrium structures encompasses the different structures we encounter in nature. Obviously the answer is no."

"Equilibrium structures can be seen as the results of statistical compensation for the activity of microscopic elements (molecules, atoms). By definition they are inert at the global level... Once they have been formed they may be isolated and maintained indefinitely without further interaction with their environment. When we examine a biological cell or a city, however, the situation is quite different: not only are these systems open, but also they exist only because they are open. They feed on the flux of matter and energy coming to them from the outside world. We can isolate a crystal, but cities and cells die when cut off from their environment. They form an integral part of the world from which they can draw sustenance, and they cannot be separated from the fluxes that they incessantly transform."

SELECTIONS FROM BOOKS (Continued)

"Looking Glass Universe", by John P. Briggs and F. David Peat

"Prigogine called far-from-equilibrium forms like the vortex, 'dissipative structures.' The name comes from the fact that to keep their shape these structures must constantly dissipate entropy so it won't build up inside the entity and 'kill' it with equilibrium... [These dissipative structures] can survive only by remaining open to a flowing matter and energy exchange with the environment... The structure is stabilized by its flowing. It is stable but only relatively stable--relative to the constant energy flow required to maintain its shape. Its very stability is also paradoxically an instability because of its total dependence on its environment. The dissipative structure is autonomous (separate) but only relatively separate. It is a flow within a flow."

SELECTIONS FROM BOOKS (Continued)

"The War of the Flea", by Robert Taber

"Almost all modern governments are highly conscious of what journalism calls 'world opinion.' For sound reasons, mostly of an economic nature, they cannot afford to be condemned in the United Nations, they do not like to be visited by Human Rights Commissions or Freedom of the Press Committees; their need of foreign investment, foreign loans, foreign markets, satisfactory trade relationships, and so on, requires that they be members in more or less good standing of a larger community of interests. Often, too, they are members of military alliances. Consequently, they must maintain some appearance of stability, in order to assure the other members of the community or of the alliance that contracts will continue to be honored, that treaties will be upheld, that loans will be repaid with interest, that investments will continue to produce profits and be safe."

"Protracted internal war threatens all of this...no ally wishes to treat with a government that is on the point of eviction."

"It follows, that it must be the business of the guerrilla, and of his clandestine political organization in the cities, to destroy the stable image of the government, and so to deny its credits, to dry up its source of revenue, and to create dissension within the frightened owning classes, within the government bureaucracy (whose payrolls will be pinched), and within the military itself."

"Isolation, military and political, is the great enemy of guerrilla movements. It is the task of the urban organization to prevent this isolation, to provide diversions and provocations when needed, to maintain contact, to keep the world aware of a revolution in progress even when there is no progress to report."

SELECTIONS FROM BOOKS (Continued)

"Social Order and the General Theory of Strategy", by Alexander Atkinson

Moral fibre is "the great dam that denies the flood of social relations their natural route of decline towards violence and anarchy"... In this sense, "moral order at the center of social life literally saves society from itself."

"Strategists must grasp this fact that social order is, at once, a moral order... If the moral order on which rests a fabric of social and power relations is compromised, then the fabric (of social order) it upholds goes with it."

In other words, "the one great hurdle in the strategic combination (moral and social order) is the moral order. If this remains untouched the formation of new social relations and social ranking in status and power either never gets off the ground or faces the perennial spectre of backsliding towards the moral attraction of established social and power relations."

The strategic imperative, then, becomes one of trying "to achieve relative security of social resources by subverting and reweaving those of the opponent into the fabric of one's own social order."

SELECTIONS FROM BOOKS (Continued)

"Beyond Culture", by Edward T. Hall

"Everything man is and does is modified by learning and is therefore malleable. But once learned, these behavior patterns, these habitual responses, these ways of interacting gradually sink below the surface of the mind and, like the admiral of a submerged submarine fleet, control from the depths. The hidden controls are usually experienced as though they were innate simply because they are not only ubiquitous but habitual as well."

"...The only time one is aware of the control system is when things don't follow the hidden program. This is most frequent in intercultural encounters. Therefore, the great gift that the members of the human race have for each other is not exotic experiences but an opportunity to achieve awareness of the structure of their own system, which can be accomplished only by interacting with others who do not share that system..."

SELECTION FROM AN UNPUBLISHED ESSAY

"Destruction and Creation", by Yours Truly

According to Godel's Incompleteness Theorems, Heisenberg's Uncertainty Principle, and the Second Law of Thermodynamics one cannot determine the character or nature of a system within itself. Moreover, attempts to do so lead to confusion and disorder.

SELECTION FROM A SPEECH

"A Model of Soviet Mentality", by Dmitry Mikheyev

"Interaction between the individual and his environment starts with his perception of himself as a separate entity and the environment as everything outside of self. He learns his physical limits and desires, and how to fulfill them through interaction with the physical and social environment. ...I maintain that the way the individual perceives the environment is crucial for his orientation and interaction with it."

"Man's orientation will involve perceptions of self as both a physical and a psychological entity, as well as an understanding of the environment and of the possibilities for achieving his goals (FROMM, 1947). Society, meanwhile, has goals of its own--preservation of its physical integrity and spiritual identity. Pursuing these goals involves mobilizing and organizing its inner resources and interaction with the outside environment of other societies and nations. ...An individual becomes a member of the society when he learns to act within its limits in a way that is beneficial to it."

SOME FAVORITE SELECTIONS

Old Fable

- But sir, the emperor is naked, he has no clothes.

Sun Tzu

- "Know your enemy and know yourself; in one hundred battles you will never be in peril."
- Seize that which your adversary holds dear or values most highly; then he will conform to your desires.

Jomini

- "The great art, then, of properly directing lines of operations, is so to establish them in reference to the bases and to the marches of the army as to seize the communications of the enemy without imperiling one's own, and is the most important and most difficult problem in strategy."

Leadership

- The art of inspiring people to enthusiastically take action toward the achievement of uncommon goals.

? - RAISES QUESTION - ?

Remembering that we are trying to see how the preceding selections are related to one another, where do we go next?

CONDENSATION
TO
ESSENTIAL ELEMENTS

COMPRESSION

- Physical as well as electrical and chemical connections in the brain are shaped by interacting with the environment. Point: Without these interactions we do not have the mental wherewithal to deal or cope with that environment.
- Godel's Incompleteness Theorems, Heisenberg's Uncertainty Principle, and the Second Law of Thermodynamics, all taken together, show that we cannot determine the character or nature of a system within itself. Moreover, attempts to do so lead to confusion and disorder--mental as well as physical. Point: We need an external environment, or outside world, to define ourselves and maintain organic integrity, otherwise we experience dissolution/disintegration--i.e., we come unglued.
- Moral fibre or moral order is the glue that holds society together and makes social direction and interaction possible. Point: Without this glue social order pulls apart towards anarchy and chaos leaving no possibility for social direction and interaction.
- Living systems are open systems; closed systems are non-living systems. Point: If we don't communicate with outside world--to gain information for knowledge and understanding as well as matter and energy for sustenance--we die out to become a non-discerning and uninteresting part of that world.

! - SIMPLY STATED - !

As human beings, we cannot exist without an external or surrounding environment from which we can draw sustenance, nourishment, or support.

IN OTHER WORDS

Interaction permits vitality and growth while isolation leads to decay and disintegration.

SUCH A SIMPLE STATEMENT REVEALS THAT:

The theme associated
with
D & C, P O C, C & C
is one of
Interaction and Isolation

- "Organic Design for Command and Control" (C&C) emphasizes interaction.
- "Patterns of Conflict" (POC) emphasize isolation.
- "Destruction and Creation" (D&C) is balanced between interaction and isolation.

KEEPING TRACK OF ALL THESE IDEAS

Let's move on and place them in a--

STRATEGIC PERSPECTIVE

NOW WE CAN SEE BY
GOING BACK TO THE BEGINNING

The Strategic Game
is one of
Interaction and Isolation

A game in which we must be able to diminish adversary's ability to communicate or interact with his environment while sustaining or improving ours.

? - RAISES QUESTION - ?

How do we do this?

THREE WAYS COME TO MIND

- Moral
- Mental
- Physical

? - WHY SHOULD WE USE THESE - ?

- Physical represents the world of matter-energy-information all of us are a part of, live in, and feed upon.
- Mental represents the emotional/intellectual activity we generate to adjust to, or cope with, that physical world.
- Moral represents the cultural codes of conduct or standards of behavior that constrain, as well as sustain and focus, our emotional/intellectual responses.

UPON FOLDING THESE IDEAS INTO OUR
INTERACTION/ISOLATION THEME WE CAN SAY:

- Physical Isolation occurs when we fail to gain support in the form of matter-energy-information from others outside ourselves.
- Mental Isolation occurs when we fail to discern, perceive, or make sense out of what's going on around ourselves.
- Moral Isolation occurs when we fail to abide by codes of conduct or standards of behavior in a manner deemed acceptable or essential by others outside ourselves.

WHILE IN OPPOSITE FASHION WE CAN SAY:

- Physical Interaction occurs when we freely exchange matter-energy-information with others outside ourselves.
- Mental Interaction occurs when we generate images or impressions that match-up with the events or happenings that unfold around ourselves.
- Moral Interaction occurs when we live by the codes of conduct or standards of behavior that we profess, and others expect us, to uphold.

! - FINE - !

But how do we play to this theme and exploit these ideas?

HINTS

- Recall how we mentally constructed a snowmobile.
- Remember how we looked at ideas in mathematical logic, physics, thermodynamics, biology, psychology, anthropology, and conflict to surface a central theme.
- Remember our whole approach has been one of pulling things apart and putting them back together until something new and different is created.

ILLUMINATING EXAMPLE

? - What does the Second Law of Thermodynamics say - ?

All natural processes generate entropy.

? - What did Heisenberg say - ?

One cannot simultaneously fix or determine precisely
the momentum and position of a particle.

? - What did Godel say - ?

One cannot determine the consistency of a system within itself.

ILLUMINATING EXAMPLE (Continued)

Point

As they appear, these statements and the ideas
they embody seem unrelated to one another.

? - Raises Question - ?

Can these statements be related to
one another; and, if so, how?

in other words

Taken together, what do Godel, Heisenberg,
and the Second Law of Thermodynamics say?

ILLUMINATING EXAMPLE (Continued)

Message

One cannot determine the character or nature of a system within itself.
Moreover, attempts to do so lead to confusion and disorder.

Keeping this statement in mind,
? - Let's ask another question - ?

What do the tests of the YF-16 and YF-17 say?

ILLUMINATING EXAMPLE (Continued)

Message

The ability to shift or transition from one maneuver to another more rapidly than an adversary enables one to win in air-to-air combat.

Now

? - What do we have - ?

A statement drawn from the ideas of Godel, Heisenberg, and the
Second Law of Thermodynamics (First Message)

as well as

A statement drawn from the tests of YF-16 and YF-17 (Second Message).

ILLUMINATING EXAMPLE (Continued)

Point

Once again, it appears that these two messages
seem unrelated to one another.

? - Raises Question - ?

Can these statements be related to
on another; and, if so, how?

in other words

Taken altogether, what do Godel, Heisenberg, the
Second Law of Thermodynamics, and the tests of the YF-16/YF-17 say?

ILLUMINATING EXAMPLE (Continued)

Overall Message

- The ability to operate at a faster tempo or rhythm than an adversary enables one to fold adversary back inside himself so that he can neither appreciate nor keep-up with what's going on. He will become disoriented or confused;

which suggests that

- Unless such menacing pressure is relieved, adversary will experience various combinations of uncertainty, doubt, confusion, self-deception, indecision, fear, panic, discouragement, despair, etc., which will further:

Disorient or twist his mental images/impressions of what's happening;

thereby

Disrupt his mental/physical maneuvers for dealing with such a menace;

thereby

Overload his mental/physical capacity to adapt or endure;

thereby

Collapse his ability to carry on.

? - WHAT'S THE POINT OF ALL THIS - ?

- We can't just look at our own personal experiences or use the same mental recipes over and over again; we've got to look at other disciplines and activities and relate or connect them to what we know from our experiences and the strategic world we live in.

if we can do this

- We will be able to surface new repertoires and (hopefully) develop a fingerspitzengefühl for folding our adversaries back inside themselves, morally-mentally-physically--so that they can neither appreciate nor cope with what's happening--without suffering the same fate ourselves.

WHICH CARRIES US TO THE
? - QUESTION - ?

- How do we fold adversaries back inside themselves, morally-mentally-physically,...without suffering the same fate ourselves?

or put another way
- How do we physically isolate our adversaries yet interact with others outside ourselves?
- How do we mentally isolate our adversaries yet keep in touch hence interact with unfolding events?
- How do we morally isolate our adversaries yet maintain the trust/confidence of others thereby interact with them?

ILLUMINATION

- Physically we can isolate our adversaries by severing their communications with outside world as well as by severing their internal communications to one another. We can accomplish this by cutting them off from their allies and the uncommitted via diplomatic, psychological, and other efforts. To cut them off from one another we should penetrate their system by being unpredictable, otherwise they can counter our efforts.
- Mentally we can isolate our adversaries by presenting them with ambiguous, deceptive, or novel situations, as well as by operating at a tempo or rhythm they can neither make out nor keep up with. Operating inside their O-O-D-A loops will accomplish just this by disorienting or twisting their mental images so that they can neither appreciate nor cope with what's really going on.
- Morally our adversaries isolate themselves when they visibly improve their well-being to the detriment of others (i.e. their allies, the uncommitted, etc.) by violating codes of conduct or behavior patterns that they profess to uphold or others expect them to uphold.

EXPECTED PAYOFF

Disintegration and collapse, unless adversaries change their behavior patterns to conform to what is deemed acceptable by others outside themselves.

ILLUMINATION (Continued)

- Physically we interact by opening-up and maintaining many channels of communication with the outside world, hence with others out there, that we depend upon for sustenance, nourishment, or support.
- Mentally we interact by selecting information from a variety of sources or channels in order to generate mental images or impressions that match-up with the world of events or happenings that we are trying to understand and cope with.
- Morally we interact with others by avoiding mismatches between what we say we are, what we are, and the world we have to deal with, as well as by abiding by those other cultural codes or standards that we are expected to uphold.

EXPECTED PAYOFF

Vitality and growth, with the opportunity to shape and adapt to unfolding events thereby influence the ideas and actions of others.

PULLING ALL THIS TOGETHER
WE HAVE IN A NUTSHELL

The Art of Success

- Shape or influence the moral-mental-physical atmosphere that we are a part of, live in, and feed upon so that we not only magnify our inner spirit and strength, but also influence potential adversaries and current adversaries as well as the uncommitted so that they are drawn toward our philosophy and are empathetic toward our success;

yet be able to

- Morally-mentally-physically isolate our adversaries from their allies and outside support as well as isolate them from one another, in order to: magnify their internal friction, produce paralysis, bring about their collapse; and/or bring about a change in their political/economic/social philosophy so that they can no longer inhibit our vitality and growth.

IMPLEMENTATION

an

example

A
MORAL DESIGN
FOR
GRAND STRATEGY

NAME-OF-THE-GAME

- Use moral leverage to amplify our spirit and strength as well as expose the flaws of competing or adversary systems, all the while influencing the uncommitted, potential adversaries and current adversaries so that they are drawn toward our philosophy and empathetic toward our success;

or put another way
- Preserve or build-up our moral authority while compromising that of our adversaries' in order to pump-up our resolve, drain-away adversaries' resolve, and attract them as well as others to our cause and way of life.

? - RAISES QUESTION - ?

- How do we evolve this moral leverage to realize the benefits cited above?

MORAL LEVERAGE

With respect to ourselves we must:

- Surface as well as find ways to overcome or eliminate those blemishes, flaws, or contradictions that generate mistrust and discord so that these negative qualities neither alienate us from one another nor set us against one another, thereby destroy our internal harmony, paralyze us, and make it difficult to cope with an uncertain, everchanging world at large.

In opposite fashion we must:

- Emphasize those cultural traditions, previous experiences, and unfolding events that build-up harmony and trust, thereby create those implicit bonds that permit us as individuals and as a society, or as an organic whole, to shape as well as adapt to the course of events in the world.

MORAL LEVERAGE (Continued)

With respect to our adversaries we should:

- Reveal those harsh statements that adversaries make about us--particularly those that denigrate our culture, our achievements, our fitness to exist, etc.--as basis to show that our survival and place in the scheme of things is not necessarily a birthright, but is always at risk.

Likewise we should:

- Reveal those mismatches in terms of what adversaries profess to be, what they are, and the world they have to deal with in order to surface to the world, to their citizens, and to ourselves the ineptness and corruption as well as the sub-rosa designs that they have upon their citizens, ourselves, and the world at large.

Moreover we should:

- Acquaint adversaries with our philosophy and way of life to show them that such destructive behavior works against, and is not in accord with, our (or any) social values based upon the dignity and needs of the individual as well as the security and well-being of society as a whole.

MORAL LEVERAGE (Continued)

With respect to others (i.e., the uncommitted or potential adversaries) we should:

- Respect their culture and achievements, show them we bear them no harm, and help them adjust to an unfolding world, as well as provide additional benefits and more favorable treatment for those who support our philosophy and way of doing things;

yet

- Demonstrate that we neither tolerate nor support those ideas and interactions that undermine or work against our culture and our philosophy hence our interests and fitness to cope with a changing world.

NOW
GOING BACK TO THE BEGINNING

? - What Is Strategy - ?

Aspect of changing intentions
A mental ~~scheme or design~~ for harmonizing and focusing our efforts as a basis for realizing some aim or purpose in an unfolding and often unforeseen world of many bewildering events and many contending interests.

? - What Is the Aim or Purpose of Strategy - ?

To improve our ability to shape and adapt to unfolding circumstances, so that we (as individuals or as groups or as a culture or as a nation-state) can survive on our own terms.

? - What Is the Central Theme and What Are the Key Ideas that Underlie Strategy - ?

The central theme is one of interaction/isolation while the key ideas are the moral-mental-physical means toward realizing this interaction/isolation.

? - How Do We Play to this Theme and Activate these Ideas - ?

By an instinctive see-saw of analysis and synthesis across a variety of domains, or across competing/independent channels of information, in order to spontaneously generate new mental images or impressions that match-up with an unfolding world of uncertainty and change.

DEFINITIONS

- Evil occurs when individuals or groups embrace codes of conduct or standards of behavior for their own personal well being and social approval, yet violate those very same codes or standards to undermine the personal well being and social approval of others.
- Corruption occurs when individuals or groups, for their own benefit, violate codes of conduct or standards of behavior that they profess, or are expected, to uphold.

DESTRUCTION &
CREATION

DESTRUCTION AND CREATION

by

JOHN R. BOYD

3 September 1976

DESTRUCTION AND CREATION

ABSTRACT

To comprehend and cope with our environment we develop mental patterns or concepts of meaning. The purpose of this paper is to sketch out how we destroy and create these patterns to permit us to both shape and be shaped by a changing environment. In this sense, the discussion also literally shows why we cannot avoid this kind of activity if we intend to survive on our own terms.

The activity is dialectic in nature generating both disorder and order that emerges as a changing and expanding universe of mental concepts matched to a changing and expanding universe of observed reality.

DESTRUCTION AND CREATION

GOAL

Studies of human behavior reveal that the actions we undertake as individuals are closely related to survival, more importantly, survival on our own terms. Naturally, such a notion implies that we should be able to act relatively free or independent of any debilitating external influences--otherwise that very survival might be in jeopardy. In viewing the instinct for survival in this manner we imply that a basic aim or goal, as individuals, is to improve our capacity for independent action. The degree to which we cooperate, or compete, with others is driven by the need to satisfy this basic goal. If we believe that it is not possible to satisfy it alone, without help from others, history shows us that we will agree to constraints upon our independent action--in order to collectively pool skills and talents in the form of nations, corporations, labor unions, mafias, etc.--so that obstacles standing in the way of the basic goal can either be removed or overcome. On the other hand, if the group cannot or does not attempt to overcome obstacles deemed important to many (or possibly any) of it's individual members, the group must risk losing these alienated members. Under these circumstances, the alienated members may dissolve their relationship and remain independent, form a group of their own, or join another collective body in order to improve their capacity for independent action.

ENVIRONMENT

In a real world of limited resources and skills, individuals and groups form, dissolve and reform their cooperative or competitive postures in a continuous struggle to remove or overcome physical and social environmental obstacles.^{11/13/} In a cooperative sense, where skills and talents are pooled, the removal or overcoming of obstacles represents an improved capacity for independent action for all concerned. In a competitive sense, where individuals and groups compete for scarce resources and skills, an improved capacity for independent action achieved by some individuals or groups constrains that capacity for other individuals or groups. Naturally, such a combination of real world scarcity and goal striving to overcome this scarcity intensifies the struggle of individuals and groups to cope with both their physical and social environments.^{11/13/}

NEED FOR DECISIONS

Against such a background, actions and decisions become critically important. Actions must be taken over and over again and in many different ways. Decisions must be rendered to monitor and determine the precise nature of the actions needed that will be compatible with the goal. To make these timely decisions imply that we must be able to form mental concepts of observed reality, as we perceive it, and be able to change these concepts as reality itself appears to change. The concepts can then be used as decision-models for improving our capacity for

independent action. Such a demand for decisions that literally impact our survival causes one to wonder: How do we generate or create the mental concepts to support this decision-making activity?

CREATING CONCEPTS

There are two ways in which we can develop and manipulate mental concepts to represent observed reality: We can start from a comprehensive whole and break it down to its particulars or we can start with the particulars and build towards a comprehensive whole.^{28/24/} Saying it another way, but in a related sense, we can go from the general-to-specific or from the specific-to-general. A little reflection here reveals that deduction is related to proceeding from the general-to-specific while induction is related to proceeding from the specific-to-general. In following this line of thought can we think of other activities that are related to these two opposing ideas? Is not analysis related to proceeding from the general-to-specific? Is not synthesis, the opposite of analysis, related to proceeding from the specific-to-general? Putting all this together: Can we not say that general-to-specific is related to both deduction and analysis, while specific-to-general is related to induction and synthesis? Now, can we think of some examples to fit with these two opposing ideas? We need not look far. The differential calculus proceeds from the general-to-specific--from a function to its derivative. Hence, is not the use or application of the

differential calculus related to deduction and analysis? The integral calculus, on the other hand, proceeds in the opposite direction--from a derivative to a general function. Hence, is not the use or application of the integral calculus related to induction and synthesis? Summing up, we can see that: general-to-specific is related to deduction, analysis, and differentiation, while, specific-to-general is related to induction, synthesis, and integration.

Now keeping these two opposing idea chains in mind let us move on a somewhat different tack. Imagine, if you will, a domain (a comprehensive whole) and its constituent elements or parts. Now, imagine another domain and its constituent parts. Once again, imagine even another domain and its constituent parts. Repeating this idea over and over again we can imagine any number of domains and the parts corresponding to each. Naturally, as we go through life we develop concepts of meaning (with included constituents) to represent observed reality. Can we not liken these concepts and their related constituents to the domains and constituents that we have formed in our imagination? Naturally, we can. Keeping this relationship in mind, suppose we shatter the correspondence of each domain or concept with its constituent elements. In other words, we imagine the existence of the parts but pretend that the domains or concepts they were previously associated with do not exist. Result: We have many constituents, or particulars, swimming around in a sea of anarchy. We have uncertainty and disorder in place of meaning

and order. Further, we can see that such an unstructuring or destruction of many domains--to break the correspondence of each with its respective constituents--is related to deduction, analysis, and differentiation. We call this kind of unstructuring a destructive deduction.

Faced with such disorder or chaos, how can we reconstruct order and meaning? Going back to the idea chain of specific-to-general, induction, synthesis, and integration the thought occurs that a new domain or concept can be formed if we can find some common qualities, attributes, or operations among some or many of these constituents swimming in this sea of anarchy. Through such connecting threads (that produce meaning) we synthesize constituents from, hence across, the domains we have just shattered.^{24/} Linking particulars together in this manner we can form a new domain or concept--providing, of course, we do not inadvertently use only those "bits and pieces" in the same arrangement that we associated with one of the domains purged from our imagination. Clearly, such a synthesis would indicate we have generated something new and different from what previously existed. Going back to our idea chain, it follows that creativity is related to induction, synthesis, and integration since we proceeded from unstructured bits and pieces to a new general pattern or concept. We call such action a creative or constructive induction. It is important to note that the crucial or key step that permits this creative induction is the separation of the particulars from their previous domains by

the destructive deduction. Without this unstructuring the creation of a new structure cannot proceed--since the bits and pieces are still tied together as meaning within unchallenged domains or concepts.

Recalling that we use concepts or mental patterns to represent reality, it follows that the unstructuring and restructuring just shown reveals a way of changing our perception of reality.^{28/} Naturally, such a notion implies that the emerging pattern of ideas and interactions must be internally consistent and match-up with reality.^{14/15/} To check or verify internal consistency we try to see if we can trace our way back to the original constituents that were used in the creative or constructive induction. If we cannot reverse directions the ideas and interactions do not go together in this way without contradiction. Hence, they are not internally consistent. However, this does not necessarily mean we reject and throw away the entire structure. Instead, we should attempt to identify those ideas (particulars) and interactions that seem to hold together in a coherent pattern of activity as distinguished from those ideas that do not seem to fit in. In performing this task we check for reversibility as well as check to see which ideas and interactions match-up with our observations of reality.^{27/14/15/} Using those ideas and interactions that pass this test together with any new ideas (from new destructive deductions) or other promising ideas that popped out of the original destructive deduction we again attempt to find some

common qualities, attributes, or operations to re-create the concept--or create a new concept. Also, once again, we perform the check for reversibility and match-up with reality. Over and over again this cycle of Destruction and Creation is repeated until we demonstrate internal consistency and match-up with reality.^{19/14/15/}

SUSPICION

When this orderly (and pleasant) state is reached the concept becomes a coherent pattern of ideas and interactions that can be used to describe some aspect of observed reality. As a consequence, there is little, or no, further appeal to alternative ideas and interactions in an effort to either expand, complete, or modify the concept.^{19/} Instead, the effort is turned inward towards fine tuning the ideas and interactions in order to improve generality and produce a more precise match of the conceptual pattern with reality.^{19/} Toward this end, the concept--and its internal workings--is tested and compared against observed phenomena over and over again in many different and subtle ways.^{19/} Such a repeated and inward-oriented effort to explain increasingly more subtle aspects of reality suggests the disturbing idea that perhaps, at some point, ambiguities, uncertainties, anomalies, or apparent inconsistencies may emerge to stifle a more general and precise match-up of concept with observed reality.^{19/} Why do we suspect this?

On one hand, we realize that facts, perceptions, ideas, impressions, interactions, etc. separated from previous observations and thought patterns have been linked together to create a new conceptual pattern. On the other hand, we suspect that refined observations now underway will eventually exhibit either more or a different kind of precision and subtlety than the previous observations and thought patterns. Clearly, any anticipated difference, or differences, suggests we should expect a mismatch between the new observations and the anticipated concept description of these observations. To assume otherwise would be tantamount to admitting that previous constituents and interactions would produce the same synthesis as any newer constituents and interactions that exhibit either more or a different kind of precision and subtlety. This would be like admitting one equals two. To avoid such a discomforting position implies that we should anticipate a mismatch between phenomena observation and concept description of that observation. Such a notion is not new and is indicated by the discoveries of Kurt Godel and Werner Heisenberg.

INCOMPLETENESS AND CONSISTENCY

In 1931 Kurt Godel created a stir in the World of Mathematics and Logic when he revealed that it was impossible to embrace mathematics within a single system of logic.^{12/23/} He accomplished this by proving, first, that any consistent system-- that includes the arithmetic of whole numbers--is incomplete. In

other words, there are true statements or concepts within the system that cannot be deduced from the postulates that make-up the system. Next, he proved even though such a system is consistent its consistency cannot be demonstrated within the system.

Such a result does not imply that it is impossible to prove the consistency of a system. It only means that such a proof cannot be accomplished inside the system. As a matter of fact, since Godel, Gerhard Gentzen and others have shown that a consistency proof of arithmetic can be found by appealing to systems outside that arithmetic. Thus, Godel's Proof indirectly shows that in order to determine the consistency of any new system we must construct or uncover another system beyond it.^{29/27/} Over and over this cycle must be repeated to determine the consistency of more and more elaborate systems.^{29/27/}

Keeping this process in mind, let us see how Godel's results impact the effort to improve the match-up of concept with observed reality. To do this we will consider two kinds of consistency: The consistency of the concept and the consistency of the match-up between observed reality and concept description of reality. In this sense, if we assume--as a result of previous destructive deduction and creative induction efforts--that we have a consistent concept and consistent match-up, we should see no differences between observation and concept description. Yet, as we have seen, on one hand, we use observations to shape or formulate a concept; while on the other hand, we use a concept to

shape the nature of future inquiries or observations of reality. Back and forth, over and over again, we use observations to sharpen a concept and a concept to sharpen observations. Under these circumstances, a concept must be incomplete since we depend upon an everchanging array of observations to shape or formulate it. Likewise, our observations of reality must be incomplete since we depend upon a changing concept to shape or formulate the nature of new inquiries and observations. Therefore, when we probe back and forth with more precision and subtlety, we must admit that we can have differences between observation and concept description; hence, we cannot determine the consistency of the system--in terms of its concept, and match-up with observed reality--within itself.

Furthermore, the consistency cannot be determined even when the precision and subtlety of observed phenomena approaches the precision and subtlety of the observer--who is employing the ideas and interactions that play together in the conceptual pattern. This aspect of consistency is accounted for not only by Godel's Proof but also by the Heisenberg Uncertainty or Indeterminacy Principle.

INDETERMINACY AND UNCERTAINTY

The Indeterminacy Principle uncovered by Werner Heisenberg in 1927 showed that one could not simultaneously fix or determine precisely the velocity and position of a particle or body.^{14/9/} Specifically he showed, due to the presence and influence of an

observer, that the product of the velocity and position uncertainties is equal to or greater than a small number (Planck's Constant) divided by the mass of the particle or body being investigated. In other words:

$$\Delta V \Delta Q \geq h/m$$

where ΔV is velocity uncertainty

ΔQ is position uncertainty and h/m is Planck's constant (h) divided by observed mass (m).

Examination of Heisenberg's Principle reveals that as mass becomes exceedingly small the uncertainty, or indeterminacy, becomes exceedingly large. Now--in accordance with this relation--when the precision, or mass, of phenomena being observed is little, or no different than the precision, or mass, of the observing phenomena the uncertainty values become as large as, or larger than, the velocity and size frame-of-reference associated with the bodies being observed.^{2/} In other words, when the intended distinction between observer and observed begins to disappear^{3/}, the uncertainty values hide or mask phenomena behavior; or put another way, the observer perceives uncertain or erratic behavior that bounces all over in accordance with the indeterminacy relation. Under these circumstances, the uncertainty values represent the inability to determine the character or nature (consistency) of a system within itself. On the other hand, if the precision and subtlety of the observed phenomena is much less than the precision and subtlety of the

observing phenomena the uncertainty values become much smaller than the velocity and size values of the bodies being observed.^{9/} Under these circumstances, the character or nature of a system can be determined--although not exactly--since the uncertainty values do not hide or mask observed phenomena behavior nor indicate significant erratic behavior.

Keeping in mind that the Heisenberg Principle implicitly depends upon the indeterminate presence and influence of an observer,^{14/} we can now see--as revealed by the two examples just cited--that the magnitude of the uncertainty values represent the degree of intrusion by the observer upon the observed. When intrusion is total (that is, when the intended distinction between observer and observed essentially disappears,^{3/}) the uncertainty values indicate erratic behavior. When intrusion is low the uncertainty values do not hide or mask observed phenomena behavior, nor indicate significant erratic behavior. In other words, the uncertainty values not only represent the degree of intrusion by the observer upon the observed but also the degree of confusion and disorder perceived by that observer.

ENTROPY AND THE SECOND LAW OF THERMODYNAMICS

Confusion and disorder are also related to the notion of Entropy and the Second Law of Thermodynamics.^{11/20/} Entropy is a concept that represents the potential for doing work, the capacity for taking action or the degree of confusion and disorder associated with any physical or information activity.

High entropy implies a low potential for doing work, a low capacity for taking action or a high degree of confusion and disorder. Low entropy implies just the opposite. Viewed in this context, the Second Law of Thermodynamics states that all observed natural processes generate entropy.^{20/} From this law it follows that entropy must increase in any closed system--or, for that matter, in any system that cannot communicate in an ordered fashion with other systems or environments external to itself.^{20/} Accordingly, whenever we attempt to do work or take action inside such a system--a concept and its match-up with reality--we should anticipate an increase in entropy hence an increase in confusion and disorder. Naturally, this means we cannot determine the character or nature (consistency) of such a system within itself, since the system is moving irreversibly toward a higher, yet unknown, state of confusion and disorder.

DESTRUCTION AND CREATION

What an interesting outcome! According to Godel we cannot--in general--determine the consistency, hence the character or nature, of an abstract system within itself. According to Heisenberg and the Second Law of Thermodynamics any attempt to do so in the real world will expose uncertainty and generate disorder. Taken together, these three notions support the idea that any inward-oriented and continued effort to improve the match-up of concept with observed reality will only increase the degree of mismatch. Naturally, in this environment, uncertainty

and disorder will increase as previously indicated by the Heisenberg Indeterminacy Principle and the Second Law of Thermodynamics, respectively. Put another way, we can expect unexplained and disturbing ambiguities, uncertainties, anomalies, or apparent inconsistencies to emerge more and more often. Furthermore, unless some kind of relief is available, we can expect confusion to increase until disorder approaches chaos--death.

Fortunately, there is a way out. Remember, as previously shown, we can forge a new concept by applying the destructive deduction and creative induction mental operations. Also, remember, in order to perform these dialectic mental operations we must first shatter the rigid conceptual pattern, or patterns, firmly established in our mind. (This should not be too difficult since the rising confusion and disorder is already helping us to undermine any patterns). Next, we must find some common qualities, attributes, or operations to link isolated facts, perceptions, ideas, impressions, interactions, observations, etc. together as possible concepts to represent the real world. Finally, we must repeat this unstructuring and restructuring until we develop a concept that begins to match-up with reality. By doing this--in accordance with Godel, Heisenberg and the Second Law of Thermodynamics--we find that the uncertainty and disorder generated by an inward-oriented system talking to itself can be offset by going outside and creating a new system. Simply stated, uncertainty and related disorder can

be diminished by the direct artifice of creating a higher and broader more general concept to represent reality.

However, once again, when we begin to turn inward and use the new concept--within its own pattern of ideas and interactions--to produce a finer grain match with observed reality we note that the new concept and its match-up with observed reality begins to self-destruct just as before. Accordingly, the dialectic cycle of destruction and creation begins to repeat itself once again. In other words, as suggested by Godel's Proof of Incompleteness, we imply that the process of Structure, Unstructure, Restructure, Unstructure, Restructure is repeated endlessly in moving to higher and broader levels of elaboration. In this unfolding drama, the alternating cycle of entropy increase toward more and more disorder and the entropy decrease toward more and more order appears to be one part of a control mechanism that literally seems to drive and regulate this alternating cycle of destruction and creation toward higher and broader levels of elaboration.

Now, in relating this deductive/inductive activity to the basic goal discussed in the beginning, I believe we have uncovered a Dialectic Engine that permits the construction of decision models needed by individuals and societies for determining and monitoring actions in an effort to improve their capacity for independent action. Furthermore, since this engine is directed toward satisfying this basic aim or goal, it follows that the goal seeking effort itself appears to be the other side

of a control mechanism that seems also to drive and regulate the alternating cycle of destruction and creation toward higher and broader levels of elaboration. In this context, when acting within a rigid or essentially a closed system, the goal seeking effort of individuals and societies to improve their capacity for independent action tends to produce disorder towards randomness and death. On the other hand, as already shown, the increasing disorder generated by the increasing mismatch of the system concept with observed reality opens or unstructures the system. As the unstructuring or, as we'll call it, the destructive deduction unfolds it shifts toward a creative induction to stop the trend toward disorder and chaos to satisfy a goal-oriented need for increased order. Paradoxically, then, an entropy increase permits both the destruction or unstructuring of a closed system and the creation of a new system to nullify the march toward randomness and death.

Taken together, the entropy notion associated with the Second Law of Thermodynamics and the basic goal of individuals and societies seem to work in dialectic harmony driving and regulating the destructive/creative, or deductive/inductive, action--that we have described herein as a dialectic engine. The result is a changing and expanding universe of mental concepts matched to a changing and expanding universe of observed reality.^{28/27/} As indicated earlier, these mental concepts are employed as decision models by individuals and societies for determining and monitoring actions needed to cope with their environment--or to improve their capacity for independent action.

DESTRUCTION AND CREATION

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REVELATION

METAPHORICAL MESSAGE

- A loser is someone (individual or group) who cannot build snowmobiles when facing uncertainty and unpredictable change;

whereas

- A winner is someone (individual or group) who can build snowmobiles, and employ them in appropriate fashion, when facing uncertainty and unpredictable change.

