

## Confronting Chaos

Comments by David G. Jones

### Introduction

"Innovation Salon" met on a cold February evening at the Canadian Centre for Management Development in Ottawa. A group of people from many sectors debated and thought on the notion of chaos. They viewed new models such as the "Sierpinski Triangle" and visited new places such as the "Seahorse Valley". It is a new experience. We discover "chaos" in the new paradigm thinking of "chaos theory". (<http://tqd.advanced.org/3493/noframes/fractal.html>.)

"Science has been turned on its head by the study of chaos and complex systems. This new research demonstrates that the universe is inherently chaotic - inherently complex and changing. But science is also discovering new structures within chaos, dynamics which create instead of destroy, dynamics which are the very foundation of growth in our universe." (Michaels)

Chaos theory challenges us to re-think deeply held beliefs which comfort and guide us in our personal and professional lives. This paper will question whether there are useful messages in the chaos debate for business and government organizations, and whether the ongoing lines of chaos inquiry will continue, or begin to be relevant to our needs.

These needs may be in high level searches for philosophical meaning, or in more practical realms, such as managing complex systems in time of turbulent change in an increasingly unstable social, political, technological and political environment.

"Guns from the sea open against us:  
The smoke rocks bodily in the casemate  
And a yell of doom goes up.  
We count and bless each new, heavy concussion -  
Captives awaiting rescue."  
(from Dawn Bombardment, Robert Graves)

Twenty years ago Ruben Nelson, then an advisor to Urban Affairs Canada, published a manuscript called "The Illusions of Urban Man". In this text, and in many other of his writings, he foresaw the advent of chaos theory and its troubling implications. But he also held hope and promise that we, as a people, would come to terms with new perceptions, new realities. And that we would move on to accomplish more meaningful control of our own lives and our environments.

Ruben cast the first stone into the chaos waters by quoting Robert Heilbroner, with words that echo those of Robert Graves (above):

"There is a question in the air, more sensed than seen, like the invisible approach of a distant storm, a question that I would hesitate to ask aloud did I not believe it existed unvoiced in the minds of many: 'Is there hope for man?'" (Heilbroner).

### ***Chaos: Perception and World View***

Most of us have difficulty accepting the notion that all is not right with the world. We find it difficult to grasp, let alone acknowledge, that our vision of reality may be impaired. That what we see is a result of our conditioning, values and beliefs. Our "world views" translate what is happening into terms we can understand, and which we then may accept, or reject. Organizational people have come to believe that our organizations are inherently stable, that the organizational chart bears more than a symbolic relationship to reality, that employees perform in the manner prescribed by role definitions and procedures. We may *recognize* that other things are happening in the workplace, but at our deepest levels we see such activities as peripheral, inconsequential and isolated.

### ***The "chaos position", and some apparent difficulties with it***

Contrary to our sense of organizational rightness, some theorists now suggest that the *normal* organizational, indeed the normal social entity state, is a chaotic one. In this, humans and their organizations differ not a bit from the behavior of eco-systems, star birth and death and continental drift. Traditional views, at either the micro or macro scale, may be thus more based on religion than fact. Others, before this current wave, have defined religion as belief systems that articulate order in an otherwise chaotic universe. There are indications that chaos, or uncontrolled and unpredictable activity are present, and possibly on the upswing:

"Among the disturbing trends described...are a resurgence of infectious diseases, including many that the world's health authorities thought were under control and gradually diminishing; growing threats to aquatic ecosystems, which have extinguished or endangered one fifth of all fish species; and the laying of 110 million landmines across 64 countries, which maim thousands of people each year, many of them children" (Vital Signs 1996).

If we can agree that there is a problem, or a multitude of them, and that we need to establish a conceptual and / or strategic focus for response, it does not help, for our consideration of its merits, that chaos theory adherents do not seem to have a unified view. The various positions appear to be as follows:

- a) The universe is a chaotic entity. All events and all elements in that universe are inherently chaotic. "Order" is impossible.
- b) The universe is a balance between incompatible elements: order and chaos. The "natural state" is an orderly one. Chaos is really dissidence that will ultimately be understood and "managed" (one gets the impression they mean "eliminated").
- c) "Chaos" really means that we do not understand all that is going on. "Order" is when we know enough to allow predictions.

These are very different takes on a theme. But that chaos theory has been embraced by the scientific and mathematics communities is an indication of to whom it speaks. Chaos theorists generate scientific experiments, models and formulae that test the chaos-order interface: to define where one begins and one ends, where one "wins" and one "loses". Some appear to believe that computer power is the new religion. By its phenomenal computational ability it is only a matter of time before all variables and interaction between those variables will be identified, and predictability, in weather among other things, will be had.

One of the chaos icons is the butterfly. Theorists suggest that the flutter of a butterfly's wings on one continent can ultimately have chaotic consequences on another.

"The flapping of a single butterfly's wing today produces a tiny change in the state of the atmosphere. Over a period of time, what the atmosphere actually does diverges from what it would have done. So, in a month's time, a tornado that would have devastated the Indonesian coast doesn't happen. Or maybe one that wasn't going to happen, does." (Stewart)

But I read further and get the feeling that they are wistfully saying: "Just give us enough computing power, and we will ultimately predict all factors and impacts":

"The slightest change in initial conditions, it was thought, caused results which appeared to follow no pattern. The advent of the calculating power of the computer has changed this belief. Patterns are being found, now that it is possible to have the machine do the immense number of calculations required to fully analyze the simplest behaviors. Yet the outcome is still unpredictable."

(<http://www.prairienet.org/business/ptech/txt/chaosty.html> )

If this is indeed what chaos theory "means", then it has defined its limitations as an organizational modeling and analysis tool. In its focus on prediction, it declares itself a tool for scientific inquiry in the material, rather than the social world. And that field alone may be forever frustrated in generating a perfect model: what if there are *infinite* variables?

Organizational theorists might see the butterfly metaphor in an entirely different way: that seemingly minor, random acts can, and do, have profound influences on widely dispersed events and conditions. That management needs to look not only at the formal and normative, and that which is known, but at individual, situational and environmental factors which can have profound influences on one's objectives or courses of action. In organizational analysis our search is for a better understanding of what is happening, and what, if anything we can do about making things happen in person-directed and organization-directed ways. If chaos is a "universal constant" then such activities may be working against potentially, and maybe insurmountable odds. What then?

### ***Ideal and Normative***

Let us consider these odds. If "chaos as normative", one feels that this flies in the face of reason. How could we function in our homes, in our businesses, in society itself, if the normative state is a chaotic one? There are rules for driving on the right side, traffic lights that work to fixed patterns (most of the time) and people show up at work on time (usually).

Perhaps here it may be useful to look at the word "chaos". Oxford gives several definitions "chaos" as a "formless void or great deep of primordial matter" and "utter confusion". It will be easier if we work with the first definition.

If we can agree that there could be a "formless void", in which things do not happen in a defined, predictable way, how can we be certain that the void does not, from time to time, overlap our perfect world? How indeed can we be sure that there is not an infrequent complete overlap: that order and the void share the same space and time? We can all think of possible examples - at times of war, natural calamity, insect infestations. We can grasp that events are happening beyond our control. We channel our entire resources into "restoring equilibrium".

But what if the over-lap is not infrequent, what if the duality of order and chaos is a constant? What if this duality extends beyond "natural" phenomena? What if what we have is an imposed order (real or believed), overlaying a continuous state of turmoil where we are never really certain what is going to happen next?

What then of our organizational models, position description, by-laws and constitutions, images, standards and volumes of law? Could they be merely statements of "ideal behavior", "expectations" and indeed our individual and social preferences? Such artifacts may be illustrations of what we want, rather than what we have. Case law could be a registry of chaos: a tabulation of events that did not happen as they should have in our perfect world.

Consider a horse race. Is it totally predictable? Is it "orderly"? Well, it is orderly as a race must be to ensure fairness and safety. It is predictable to a degree based on past performance, breeding, the skills of the driver and the competition. But there order and predictability ends. If it did not, there would be little incentive to purchase a pari-mutuel ticket.

### ***Implications***

The Innovation Salon asked the question: "What are the consequences for chaos theory on organizational management?". We were told about the "shadow organization" - the "near reality" that operates within formalized organizations. This is what we used to call, in sociology, the "actual organization" as against the "ideal organization" described in the org charts. It was suggested that management needs to be aware of, and understand that his or her organization operates on both orderly and predictable bases, and on "disorderly" (but not necessarily dysfunctional) and completely unpredictable bases (Vincent p. 166). We also need to look closely at the rationale upon which our institutions were, and are being built

If order and chaos coexist, always, and everywhere, is it enough for a manager, or any individual for that matter, to simply know that? Or is it necessary, if we are to do more than enjoy biological continuance (and that makes many assumptions), come to a deeper, more profound understanding of the disorder in our lives? Assuming chaos and disorder as elements in a normative world, is it necessary, for progress, development, and possibly the sanity of our society and its institutions for us to grapple with, grasp, and as far as we may, wrestle chaos to the ground? Or could we (simply!) change our own understanding so that we might better adapt to a universe that has more than a little unpredictability?

Some chaos theorists seem deterministic in their views, that for example social organisms move through cycles, from equilibrium to chaos, and back to equilibrium again. "Leadership" they seem to say, (must) rear its head when organizations peak out and bottom out. In these illustrations the example of commercial competition is used. Stagnant organizations need to re-generate to re-capture failing market share. Organizations "in chaos" (meaning, one presumes, uncontrolled creativity for example) must be periodically "brought back in line".

If this is the social application of the chaos scientific model I don't believe it has a great deal of utility for organizations seeking continuous profit or sustainability. Innovation, experimentation, continual visualization and re-visualization would seem to me necessary management and employee constants. Without it there is true chaos: that is, corporate dissolution. How do chaos theorists explain the Netscape phenomena? I think chaos is ever-present in our being, and that "successful"

people and organizations understand that. They are the ones who know how to "capitalize" on "circumstances".

According to some authors, there is a need for social organizations to come to grips with these new perspectives, urgently, because public institutions are "stabilizing agencies". Douglas Kiel states the need for a "stabilizing force in the midst of political and social change. Recognizing that instability is essential to all living systems does not minimize the stabilizing role of public administration" (Kiel).

### ***The Notion of "Equilibrium"***

But is there an equilibrium anywhere at all? Is there any sense to our wishing that we could "return to more stable times, to times when change was not occurring so fast"? These may be serious wishes, and we would be more than a little disappointed to hear that such will not be, indeed have never been. We tend to blame the media for keeping us in what we do call "a continual state of chaos", as if they were (and they may be sometimes) responsible for the events instead of just reporting them. But perhaps the media is just doing a very good job of reminding us continually that at any moment, our carefully monitored and controlled chaos can, and does, break out with a vengeance. Is there a message in the existence of the new age wonder drug's name that is drawn from the word "equilibrium"?

I am uncomfortable with the notion of "equilibrium". My Concise Oxford says it is a "state of balance". An interesting definition that, because a "state of balance" is what one achieves when one "neutralizes" opposing forces. Do we really have individuals, shops, schools, TV networks or families of prairie dogs "in equilibrium"? I think not. We may have, perhaps, "sustainable situations". But being "in equilibrium" I think, means non existence. A human whose life processes were "in equilibrium" would not be growing, aging, learning and changing. And that person would, I think, not be adapting to new situations and circumstances. Equilibrium seems to be a one way, terminal state. Is it an indication of changing perceptions that most everyone now agrees that "change is a fact of life"? Ralph Stacey challenges the whole issue of what he calls the "stable equilibrium mind-set" - seeking instead "nonequilibrium and tension". This is "the positive use of tension and conflict to create and generate new perspectives", recognizing that "chaos...is the true state of a successful business" (Stacey).

### ***Moving On: Views and Tools***

Internalizing a new belief in a chaotic universe does not mean that we dispel with the reality of order, or its value. We do need, if we are to live and work in a socially productive, and hopefully synergistic manner, to have rules, conventions and laws. We do need to be highly certain that people will continue to drive on one side of the road. That people will not have the ability (or the right) to destroy others to achieve their own ends.

Is there is a natural order in a universe where chaos is the norm? To answer this question chaos theorists point to "fractals" (<http://zenith.berkeley.edu/seidel/Frac/fracexp.html> ). Fractals are illustrations of (real or apparent) order in a (real or apparent) disordered universe. The best example is perhaps the fern, where each frond is actually a collection of similar (or identical?) fronds. And these smaller fronts themselves decompose into yet more fronds....down past the microscopic level (to infinity?). Fans of fractals like to "zoom" down into them and have software just for this purpose. (<http://chat.carleton.ca/~pderbysh/mandlfaq.html>)

Is there utility in these images of infinite repetition? Organizational theorists and practitioners need to know whether component parts are identical to their "parents". The Chaos MetaLink (<http://www.industrialstreet.com/chaos/metalink.htm> ) describes fractals as "generally self-similar and independent of scale." They seem to be linear, with motion occurring in only one direction:

"According to Mandelbröt, who invented the word: 'I coined fractal from the Latin adjective fractus. The corresponding Latin verb frangere means "to break:" to create irregular fragments. It is therefore sensible - and how appropriate for our needs! - that, in addition to "fragmented" (as in fraction or refraction), fractus should also mean "irregular," both meanings being preserved in fragment."

([http://spanky.triumf.ca/pub/fractals/docs/SCI\\_FRACTALS.FAQ](http://spanky.triumf.ca/pub/fractals/docs/SCI_FRACTALS.FAQ) )

Only drilling down into "disorder" to find "order" is a line of inquiry of limited relevance to organizational analysts. Fractal significance, is, I think, found in traveling both up and down on the fractal. Traveling "down" we may find useful messages that could help us discern order and chaos in an "historical" way. Traveling "up" may help us look forward to visualize new potential realities. In moving forward on the "fractal continuum" we can learn to identify "order in chaos" (or order and chaos) processes. This may help us in our organizations: to look beyond structures and assumptions which date from around the time of the invention of moveable type.

Such "continuum traveling" would not, incidentally, lead us to "create order out of chaos". But I think we could, with a changed value set and perspective, design and build better institutions (and possibly ourselves) through an understanding that disorder may be as system inherent as order. In this, we are perhaps "ordering chaos" so that we can work within it, and with it. We are, I think, searching for branches more than we are seeking roots. It will be a point of departure when we recognize that everything is not, and can not be controlled. We will be, in my view, at a point where we can increase our personal and social adaptability. Paradoxically, for we would need to abandon comfortable, long standing views, there may also be a new source of comfort - "answers" from a metaphysical religion.

### ***Organizational and Personal Application***

Chaos theory could have value for us. By "turning the universe upside down" it challenges "truths" which are so long held as to be self-evident. But chaos theory focuses on a scientific methodology in a physical universe. People and their organizations do not, and are not amenable to formula behavior. (<http://www.ipc1.com/MASS/taxonomy.html#taxonomy>). Even were we to assume that it is possible to identify all the variables impacting on a person, organization or event, would we ever want to create such a device? Would we want evolution controlled? Would we want a world where we have a Grand Unified Theory of human behaviour? What then of the Mozarts of the next millennium? What of our front line worker who, with a flash of insight, discovers an entirely new way to deliver services smoother, faster and cheaper? Will that occur when all is known, and "managed"?

We, in all sectors, now know at intuitive levels that personal growth and change are necessary survival conditions. We also know that when we order our world (such as through "environmental management") we often fail. Could it be that "the new order" is one where our first step is one of recognizing that we cannot, and indeed should not try to control all that is happening in our homes and our places of work. That we should not feel threatened when events are "out of

control" - that we are simply seeing what has been happening all along, only now manifested? That maybe we ought to re-visit the expression "go with the flow"? And perhaps experiment with "non-linear" approaches? (Priesmeyer).

The transition, if we do indeed decide to make it, will not be easy. And we should expect, that if it is to be effective at the personal or societal level, it will not occur in an orderly manner. Robert Graves' poem "In Broken Images" describes well the position and path. It is a good start point for someone who wants to experience perceptual adjustment. There are other exercises that one can consider.

### ***Start With Yourself: Introspection***

If your immediate reaction to discovering the "edge of chaos" is to label it the "lunatic fringe" your intellectual limbering up may take a little time. But assuming you are at least open to the chaos notion here are some personal considerations you might make:

- Read things totally unrelated to your work. Business Week recently profiled a market analyst who attests he reads only supermarket tabloids. Consider subjects that "you always wanted to know about". It may be pyramid construction. Or particle physics. Or ham radio. Or the Greek seeds of government. Set your goal to become an expert in the subject. Give a public lecture. Next, study a subject you have long dreaded but which you know deeply is important to you.
- Join a special interest group (SIG). This should not be gardening or philately - do that on your recreational time. Your SIG should be focused on an area where you have a glimmer of interest or complaint (for motivational purposes). Attend meetings, whether virtual or real. Express some views, even, or especially if you think them "off the wall".
- Play with models. Try to map out, for example, the power relationships between you and your family and co-workers. Is the power relationship constant, or does it vary by circumstance? Does it directly correlate to the "normative model"? Then, move on to modeling the steps you now take to reach a decision. And then, the steps that you would take if you discarded formal relationships.
- Try your hand at art, or poetry, or music. Write a sonnet or a sonata. Ask people what they think of your work. Think on your reactions.
- Invent a game. Build a prototype. Write up the marketing plan. Test the game with a group of friends. Start with a creative process such as matching up unlike conditions: "Get Smart" was a successful TV comedy, in large part because it used the common for the unusual - shoes for phones, phone booths for front entrances.
- Play with your values and perceptions. Some examples:
  - imagine that chaos at work is the fun part of your job
  - write down (for your lifetime) your three greatest successes
  - imagine you have a week to live. Now what?
  - think about what makes you most angry with yourself and with others
  - design a flag that would symbolize your life



### ***Then your organization***

- Consider:
  - the last time you said: "Yes that would be great, but....."
  - where "trouble" always starts in your organizations
  - who is continually "pushing the envelope"
  - the five events in the last year you were unprepared for.
- Without looking at the corporate mission statement write the one that you would install if it was your choice. Ask yourself why you haven't recommended this change before. Then try your hand at the corporate goals. Match your goals to the proportion of corporate resources dedicated to serving each. Prepare to be surprised. Decide what you are going to do about it.
- Do a file search. Find the last time you complained about something or were "Chicken Little". Consider whether, or why you did not follow up the issue.
- Review the C.V.'s of your immediate subordinates. Map their five top skills to what you expect of them to what the corporation expects of you.
- Scan the organization. Make a list of the "informal groups" that meet regularly over things that interest them. Note whether these meetings take place on "their time" or "company time". Find out if their activity is legitimized, or tolerated, by the organization.
- Look at the minutes of your last five management meetings. Identify the occasions when items were discussed that related to the corporate goals. Or the goals you wrote up earlier.
- Look at the raw data from the last employee survey. Focus on the data gained from employees who were "un-satisfied".
- Try some experiments. Challenge your employees or co-workers to tackle a project but tell them the situation is urgent and that they should disregard the "normative" stuff that gets in the way. They should choose their own team leader, if indeed they are to have one.
- Ask your management whether there is a possibility of holding 45 degree meetings or goal meetings to complement the vertical and horizontal ones. You may have to explain this request.

Personal and corporate value re-visitations can be stressful on you and on the organization. There is also an element of risk as you uncover discordant notes in both your sonata and the corporate activity - goal relationship. You do not have to "suspend belief" to take a serious look at the "shadow organizations" you are part of, but you may have to take a leap to consider that they may have critical importance. And that what is happening in the informal sphere may be more corporate goal related than what was discussed at the last business meeting you attended.

The first challenge is understanding the normative and non-normative values and processes at work, at play and at home. The second step involves linking these processes to your personal and professional plans. And from beginning to end, one's challenge is to be open to the new, the odd, and sometimes even the bizarre. For it is in the chaotic that one finds the genesis of ideas - and ideas are mission critical.

### **About the Author:**

**David G. Jones** is a TBS manager on secondment to Public Works and Government Services Canada. His recent publications include articles in the FMI Journal, CIO Canada, and the AFCEA Canadian. [david.jones@pwgsc.gc.ca](mailto:david.jones@pwgsc.gc.ca)