

From Lee Hock
2/24/94

SANTE FE INSTITUTE
March 13, 1993

It was certainly kind of Jim and Ed to invite me to Sante Fe, though a bit puzzling why, after such a long day and pleasant dinner, they choose to inflict on you yet another speaker, especially one who is not an academic, not a scientist, does not speak mathematics and has no connection with the Institute. Either they judge your tolerance exceptional or your sins excessive and richly deserving punishment. I hope to avoid testing the limits of either.

One hundred twenty days ago I hadn't the vaguest idea the Sante Fe Institute existed. since then it has haunted my mind. To tell you why requires weaving a narrative web from filaments of history, biography, theory, experiment and even a thing or two bordering on the occult.

First, may I beg a small indulgence? Language is only secondarily the means by which we communicate, it is primarily the means by which we think. As I began thinking about the Institute the word "complexity" seemed much too vague to describe the science you pursue. Yet I found it cumbersome to think or write about the institute in the long string of adjectives by which its work is so often described. Gne

After grubbing in various lexicons for roots, meanings and a more suitable word, it seemed simpler to construct one. Since that which you pursue is said to lie between chaos and order the first syllable of each was borrowed and Cha-ord emerged.

By Chaord, I mean any autocatalytic, adaptive, non-linear, complex system, whether physical, biological or social, the behavior of which exhibits characteristics of both order and chaos.

Via derivation comes chaordology, chaordologists, biochaordologists, chaordic computation Chaordogenesis and a whole host of others. One of the principle charms of the word is that it is simple enough for me yet derivatives are multi-syllabic enough for the most demanding academic. The word has become mildly addictive so, for a short while, please humor me with its use.

My purpose this evening is to introduce you to a particularly rich, robust Chaord, relate it to the work of the institute and raise a simple question.

But first, some history.

VISA had its genesis four decades ago as a California service of the Bank Of America called BankAmericard.

Concerned with possible erosion of their customers, five banks in California joined together in 1966 to launch Mastercharge, affiliating with several banks across the country for reciprocal acceptance of cards. In turn Bank of America began franchising BankAmericard. Other large banks and bank consortiums launched proprietary cards and offered franchises. Action and reaction were soon rampant.

Bank after bank mass issued cards with little regard for customer qualifications while billboards and television screamed such blather as "The card you wont go berserk with", a challenge the public accepted with alacrity.

By 1968 the infant industry was out of control. Operating, credit and fraud losses were enormous. Life Magazine ran a cover story depicting banks as Icarus flying to the sun on wings of plastic, beneath a red sea labelled losses into which banks would soon plunge, wings melted, to drown.

Bank of America called a meeting of its licensees to discuss operating problems. The meeting disintegrated into acrimonious argument and accusations. In an effort to salvage something BofA proposed forming a committee of seven to discuss a few critical problems and propose solutions, which the bank would then attempt to impose. I was one---of the people, not the problems, or so they supposed.

How I came to be there has some relevance, so a bit of biography.

I was born, the youngest of six, to authoritarian, laboring parents with but eight years of schooling, in a small, mountain community dominated by an insular religion of which we were part. At an age too young for memory of the source came two grand passions, the love of nature and of books along with necessity to pursue both without guide or mentor.

With school and church came unremitting boredom coupled with sharp, rising awareness of the chasm between how institutions professed to function and how they actually did. At thirteen came rebellion against family, church, and community. Not the chest beating, massified, rebellion of the sixties, for that would not have been tolerated, but stubborn refusal to accept orthodox ideas, be persuaded by authoritarian means or seek acceptance by conformity.

A perceptive high school Dean brought me to forensics with success enough to perceive both what it means and what it costs to excel. Another at a small, local college put me in the way of the classics and awareness of both the power and limitations of reason. However, continual conflict with both institutions inflamed a growing preoccupation with the paradoxes inherent in institutions and in the people who hold power within them.

Thus at twenty, newly married, unemployed, hardened by eight summers of manual labor, eager to learn, averse to being taught, absurdly idealistic and naive, emerged the ultimate Lamb eagerly hunting the Lion of life. It was quick to pounce.

The Lamb fell into a job at small, floundering branch office of a consumer finance company. Six months later the manager departed and his lot fell to the lamb. Protected by remoteness, anonymity and insignificance three people, whose average age was twenty, ignored company commandments and did things as conditions, common sense and ingenuity combined to suggest.

Within two years the office led the company in growth and profit. Anonymity was gone and the inexorable fists of hierarchical power and orthodoxy were pounding for conformity. The Lamb was gone to open a new office in a small, Oregon town.

The pattern repeated itself. A year and a half later the Lion and the Lamb came face to face in the Los Angeles headquarters, the lamb, responsible for nationwide marketing and determined to change the company; the company determined to corral the lamb. It was simply no contest. Within the year a badly mauled lamb was bleeding on the sidewalk much wiser in the ways of linear, hierarchical systems and the people who hold power within them.

With assurances of a share of profit and liberty to use unorthodox methods the lamb trotted off to salvage the affairs of a small investment company, the victim of corrupt management. Six years later the lamb sat down with the owner to divide a handsome profit from the sale of a very, successful company, only to come face to face with snarling, naked greed and an amazing display of accounting and contractual legerdemain.

Badly sheared and again shivering on the sidewalk, no longer a lamb but no less a sheep with a growing family to support, it wandered to Seattle to supervise the regional entry of a financial conglomerate into the consumer lending business. Don't bother to hold your breath. Yes, It happened again; Conflict between iconoclastic, innovative methods and the naked fists of hierarchical power and orthodoxy, and with the same painful result.

After sixteen year of management and an unblemished record of success the sheep, at thirty six, was a complete failure; just another hunk of unemployed mutton. There is no tenure in the stockyard.

As an aside, I am delighted to inform you that only one of those companies now exists; it but an emaciated shadow of its former self.

Irrevocably committed to Iconoclastic concepts and methods yet sick of hard walls and a bloody head the sheep decided to engage in that favorite American pastime, retirement on the job, selecting a bank where

a modest living could be had at the cost of a pleasant demeanor, conformity and a fraction of ones ability and effort.

Throughout the years the sheep had continued to read and study avariciously, including much organizational theory, economics, science and philosophy. The preoccupation with organizations and the people who led them had become an obsession, which led to several growing convictions.

First; that the greatest danger to people and civilization was not the bomb or the environment but greater and greater concentration of power in fewer and fewer hands.

Second; that huge hierarchical pyramids of power, whether political, social or economic were aberrations of the Industrial age antithetical to the human spirit and to other evolutionary systems.

Third; that the real consequences of emerging Science and Micro-technology was not gadgets, whether bombs or Sony Walkmen, but radical, social and organizational change.

Fourth; that the new age could best be described as the age of mind crafting since information is nothing but the raw material of that incredible factory we call mind and the pseudo mind we call computer, while software, the tool with which we shape that information, is purely a product of the mind.

Along the way the sheep had bleated a thousand oaths that were it ever to create a flock things would be different, easy oaths to bleat for the possibility simply did not exist.

Within the year the Lion pounced again, the bank took a card franchise from Bank of America, the sheep was driven into management of the program and, succumbing to the siren call of his old ways, was on the way to another successful failure, this one irrevocably intertwined with the calamity the industry had become.

Thus my presence at the meeting and appointment to the committee. The committee seemed an exercise in futility and I privately said as much to the BofA representatives, suggesting that the committee, instead, consider the sole question of how to create an orderly method of addressing all problems.

They agreed, but concerned it might be suspect if proposed by them, insisted I put it before the meeting. The audience, in the way of all large, disorganized groups faced with a proposal requiring no commitment, money or effort, readily assented. The meeting disbanded, the committee met and I was elbowed into the chair with no intent but to do a bit of civic duty.

It is on just such tiny bearings that Chaords begin to turn, evolving by means impossible to discern to ends beyond knowing.

Within six months a complex of regional and national committees involving all licensees had been formed which had but one redeeming quality; it allowed organized information about the problems to emerge. They were much worse than anyone had imagined; far beyond any possibility of correction by the existing structure. And suddenly there, like a diamond in the dust, it lay, the need for a radically different form of organization and a precarious foothold from which to make the attempt.

it was necessary to rethink in the most fundamental sense the function of a bank, of money and of credit cards; even beyond that to the essential elements of each and how they would change in an electronic environment. Several conclusions slowly emerged.

First; that ^a money would become nothing more than guaranteed, alpha-numeric data in the form of arranged electrons and photons which would move around the world at the speed of light by infinitely diverse paths at minuscule cost.

Second; that any institution capable of the custody, loan and exchange of alpha-numeric data in the form of arranged particles would, by function if not by law, be a bank.

Third; that a credit card was no more than a device for the exchange of value in the form of arranged particles and the demand for that exchange was global.

Fourth; that whatever organization could best globally guarantee, arrange and transport alpha-numeric data in the form of arranged particles would have a market that beggared the imagination.

No nation could do it. No single hierarchical corporation could do it. On a hunch I researched and made a rough calculation of the resources of all the banks in the world. The total dwarfed the resources of most nations. They could do it, but how. As the ant said when he announced he would kill an elephant and was questioned as to how; "details, details, details."

It was beyond the power of reason to design such a Chaord and the reach of the imagination to perceive all the circumstances and permutations it might encounter. ~~yet evolution routinely tossed of much more complex Chaords with seeming ease. It gradually became obvious that such an organization would have to evolve.~~

I asked three others to join me as a small committee to address a single question based upon a single assumption. If there were no restraints whatever; if anything imaginable was possible, what would be the nature of an ideal organization for the evolution of Bankcards?

~~We isolated ourselves in a small, remote hotel. There followed a week of intense, night and day, often contentious discussion. Slowly, painfully~~

a dozen or so, very simple, one sentence principles emerged, more than enough as it proved to be. Let me give you some examples.

It must be equitably owned by all participants.

Power and function must be distributive to the maximum degree. By that we meant no function should be performed by any part of the whole which could reasonably be done by any peripheral part and no power vested in any part which might reasonably be exercised by any lesser part.

Authority must be distributive within each governing entity.

By that we meant that governance should be so constituted that no individual, institution, combinations of either could dominate or control either deliberations or decisions.

It must be infinitely malleable yet extremely durable.

That is, it should be capable of constant, self generated, modification of form or function without sacrificing its essential nature or embodied principle.

It took six months to perfect and gain acceptance of the principles among licensees and Bank of America. they were accepted largely because no one, and I mean no one, self included, thought that such an organization could be brought into being. But we had become enamored of the principles and were forced to the attempt for there was no other alternative.

We could find no organization to emulate. Elements were found everywhere, a suitable pattern nowhere. Innovation was the only answer. There followed an intense, year long effort involving a great many people and disciplines. The principles were gradually enlarged into a concept, the concept into a theoretical structure and the structure fitted into the interstices of law, custom and culture. In June, 1970, we proved ourselves wrong and the VISA Chaord came into being.

I still find it impossible to describe that community but let me tell you a few things about it.

In the strict, legal sense VISA is a non-stock, for-profit, membership corporation. In another sense it is an inside out holding company in that it does not hold but is held by its functioning parts.

The financial institutions which create its products are, at one and the same time, its owners, its members, its customers, its subjects and its superiors.

It exists as an integral part of the most highly regulated of industries, yet is not subject to any regulatory authority on the face of the earth.

It is a highly entrepreneurial, unorthodox organization implanted and operating in the heart of the most traditional, orthodox, business community.

It is a Chaord, the totality of which, excluding thousands of affiliated entities, would, if converted to a stock company, have a market value of \$70 billion. Yet it cannot be bought, traded, raided or sold since membership is held in the form of perpetual, non-transferrable membership rights. However, that portion of the business created by each member is reflected in their stock prices and their part of the business can be sold to any other member or any entity eligible for membership, a very broad, active market.

7 * Through VISA members distribute a substantial part of their expense at the cost of a minuscule part of their income. The core of the enterprise can sell services outside the membership and return resultant profits to them either in the form of reduced prices for service or actual distribution and can control the flows so as to remain virtually tax free.

7 * Its product is the most universally used and recognized in the world, yet the organization is so transparent its ultimate customers, most of its affiliates and some of its members do not know it exists or how it functions. At the same time, the central core of the enterprise has no knowledge of, information about or authority over a vast number of the constituent parts. No part knows the whole, the whole does not know all the parts and none has any need to. The entirety is self regulating.

It espouses no political, economic, social or legal theory, transcending language, currency and culture to successfully work with and harmonize relations between countries, institutions and peoples of every persuasion. It has gone through a number of wars and revolutions, the belligerents continuing to share common ownership, never ceasing reciprocal acceptance of cards or exchange of sales drafts even though they were killing one another.

Although it operates in 257 countries and territories it has never parted with a penny to gain entry into any country or market, or for any legislative favor.

It is a chaord which in five years transformed a troubled product with a minority market share into the single, most profitable banking service and a dominant market share. It has had no less than twenty and as much as fifty percent compound annual growth, through the best and the worst of times.

The core of the organization has both authority and liberty to create products and no power to implement them since, by embedded principle, no member is obliged to offer more than a single product to more than a single customer.

Its products combine on each payment device multiple trademarks of different entities, the VISA mark signifying that which is universal to the whole, other marks signifying that which is unique to each part, thus combining within a single totality maximum cooperation in some elements with the most intense competition in others.

It is a Chaord with unlimited ability to replicate itself in a variety of forms in ascending, descending or parallel order, each replication irrevocable and subject only to embodiment of fundamental principles. It has repeatedly done so. Each bifurcation has the same replicating ability. Thus membership may be had either directly, or through multinational group members, national group members and sub national group members, and affiliation of non-members may be had by independent contract with any member.

All VISA members are free to issue or not issue, to own, create, price, market and operate all products and otherwise meet their obligations of membership in any manner they choose, provided only that they meet the standards of quality and policies of the whole, which are in turn derived from and controlled by them. In doing so, they may use all the services of the central organization or none at all.

A staff of less than two thousand scattered in twenty one offices in 13 countries on four continents guides this half trillion dollar business, providing product and systems development, membership development and support, advertising, marketing and around the clock operation of two global electronic communication systems with major data centers on three continents.

Within that staff and in concert with members groups constantly, evolve, dissolve, interconnect and disconnect in response to needs and tasks in such diverse ways and for such diverse purposes as to make an organizational chart meaningless.

Its employees received mediocre salaries by commercial standards, could never be compensated with equity, yet were often described as over motivated. For many years there were no private offices, titles, job descriptions or required reports.

Visa operated on the basis of complete openness and trust. Within hours after each board meeting or other significant event it held staff meeting of every employee conducted by the most senior officer present, at which everything which had transpired was reported and any employee was free to ask any question about the events or about anything else of concern to them. The officer in charge answered fully and when in doubt, obtained the answer and provided it at the next meeting. Nothing was confidential within the organization, yet there was but one leak to the press in fifteen years.

It is a Chaord which has multiple boards of directors within a single, legal entity, none of which can be considered superior or inferior as each has irrevocable authority and autonomy over geographic or

functional areas. Their interests are often opposed yet they are served by common officers and staff. The Chief Executive Officer reports to, and is a member of, five boards on three continents composed of more than one hundred directors from different institutions located in thirty five countries. Meetings require simultaneous translation in four languages. The elective process is such that neither the Chief Executive nor any Board can control who is elected.

Each board met four times a year, the most important in conjunction with an annual meeting of members. That board meeting is open on a non-participatory basis to everyone in attendance, including spouses and invited guests, with simultaneous translation in four languages.

It is a quasi operating, quasi governmental, quasi consulting, quasi franchising, quasi entrepreneurial, quasi research Chaordic hybrid, which I believed then and believe today to be a prototype of organizations of the twenty first century; one which had both the good and bad fortune to be born a quarter century before its time. I believed then and I believe today that it is a prototype of institutions of the twenty first century and its product will be the genesis of the first global currency.

No one, certainly not I or any of its current officers and directors, comprehends all parts of the totality or could exercise dominion over them. It has a life of its own; and that is precisely as it must be, for successful Chaords swiftly outpace the human mind. It is only their principles which it is essential to comprehend, carefully preserve and meticulously honor, for if not, hot old chaos and frozen old order lurk just around the corner.

Enough of the experiment. Lets move to the Institute.

Business, as such, has never much interested me. Eight year ago I severed all connections with VISA and the business community to pursue other dreams and a life of books, nature, isolation, anonymity.

Over the years I had occasion to read a good deal about scientists and their work, including Halle, Feynman, Einstein, Alvarez, Gould and a host of others, including some present this evening. A few years back Chaos theory particularly intrigued me.

Four months ago while casually browsing through a book shop, Waldrup's Complexity caught my eye. I read it through with considerable astonishment.

Behind the hyperbole and contradictions appeared concepts which echoed a lifetime of experience. If I may borrow one of your less charming, lingual popularities the book "resonated". (sounds like a buzzing in the head doesn't it)

For thirty years I have been arguing that there is a reason why present organizations, whether political, economic or social, are unable to manage their affairs, why commerce and society are increasingly in disarray; that Hierarchical, organizations and the management techniques they spawned, such godsend to that age, are not only anachronisms of that dying age which cannot survive, but are a positive public menace; that they are aberrations antithetical to the human spirit and to the whole history of biological and physical evolution:

I have argued that the vast communication networks beginning to emerge are really economic, neural networks around which nations and corporations will be forced to reorganized; that future organizations will not be hierarchical but more akin to the organization of neurons in a brain; that cooperation and competition have no contrary meaning and that nothing has ever existed or ever will exist in a world of sentient, sapient beings with out a balance of both approaching equilibrium; that life itself exists in the intervals between extremes.

The concepts in the book were not astonishing; they seemed like old, familiar friends. What was astonishing was that they were emerging in the scientific community. It is the last place I would have expected such synthesis to arise.

That evening at dinner as I spewed out my excitement to Ferol, alternating between hope there was substance behind the book and doubt that there could be, she laughingly remarked, "I haven't seen you so excited in years. Climb down from the ceiling, contact the Institute and find out for yourself". No I replied, all that is behind me. Let the dead bury the dead."

And now we approach the occult.

Early the next morning I received a call from someone I had met briefly but once five years before, during which we discovered a common interest in books. For no apparent reason I had come into his mind as someone who might be able to assist one of his friends with a small start up company. As we were about to end the conversation he casually asked if I had read any interesting books lately. I mentioned the reaction to "Complexity".

"Amazing", he replied, "I am discussing the possibility of becoming a trustee. The Chairman is a personal friend and you must meet him. I'll arrange a lunch. And Steve Millard did just that.

Within the week Jim Pelkey and I were at lunch spewing over each other like two, small, erupting volcanoes as we shared his experiences with the institute and mine with VISA. Before the lunch ended I was invited to a dinner with Leo Buss, and to Sante Fe for a presentation of adaptive computation and a meeting of the executive committee.

It was not just the science which intrigued me, but the institute itself. I wanted to know the nature of the beast; its structure, its

governance, how it functioned and whether its anatomy and practices reflected the concepts upon which the emergent science was based.

Jim generously provided copies of the charter, the bylaws and information about committee and management structures. After that there was nothing for it but to come to Sante Fe. Rarely have I been more kindly treated by so many people with so little cause to do so, been more intrigued by what I learned or left with a more fermenting basket of interest, respect, skepticism, belief and misgiving. The Sante Fe Institute is, indeed, a strange attractor.

From my perspective there are surprising parallels between your situation now and that of the VISA community prior to its metamorphose.

You perceive a need for a new form of science, and We perceived a need for a new form of value exchange.

You perceive present academic institutions are not ideally structured to meet that need, and we perceived financial institutions in the same way.

You seek to bond yourself to a complex of institutions both within and without your traditional community, and we sought the same.

You seek to meld diverse disciplines into a whole greater than the parts, and we sought the same.

You pursue objectives which transcend institutions, nations, cultures, laws, languages, economic and political theories, and we pursued the same.

You lack adequate resources with which to pursue your objectives, and so did we.

What you attempt is made possible by the evolution of computational technology, which is an integral part of it, and so it was with us.

You seek to be an enabling organization linking a complex of affiliated institutions engaged in Chaordology and to be the cutting edge in that field and that is what we sought in ours.

I could go on for some time, but enough. That your origins are in the academic world and ours were in the commercial is, from my perspective, not relevant. A chaord is a chaord is a chaord is a chaord until the end of time, or at least, that is what I hope you will discover.

All my experience and instincts tell me this. You have caught the right scent. You bay the right quarry. If you can discover even a few laws common to all Chaords, if you can gain acceptance of those laws throughout the world, if those laws lead to new concepts of organization more in harmony with the Chaords we call people and the social, economic and physical Chaords in which they by necessity exist you will have done a very great service indeed.

So at the risk of being presumptuous let me ask the simple question which haunts my mind, wish you well, then duck and run for cover.

Is the Sante Fe Institute an incipient Chaord who's greatest experiment should be itself?

Thank you for inviting me and for your patience and courtesy while listening.