

Posted to the Gilder forum - July 7, 2001

The Tower of Babel

This bear market is the result of a massive shakeout in the Telecom. Even those that saw it coming didn't imagine the massive scale it would have. We were guided by historical precedent and this precedent was not capable of forecasting the future. Stuart Kauffman, author of [At Home in the Universe: The Search for the Laws of Self-Organization and Complexity](#) has the answer even if he never thought about the stock market.

We saw the positive side of the Telecom Tsunami, all the companies that were set to build the future. What we forgot to think about was the effect that the massive destruction of older companies would have. The buggy whip maker, the saddle maker and the smithy all disappeared when the automobile came along. It must have caused a very high level of pain. Unfortunately, history is written by the winners so we never heard the story as told by the losers. I bet there were many valuable lessons we could have learned from the losers.

Today the whips, saddles and horse shoes going out of style are SONET, ATM, EDGE, TDMA, GSM, FAX, TELEX, and many of their attendant purveyors. At the beginning of the last century, there were very few corporate shares in the hands of the masses and there were very few chains and national franchises so it was very unlikely that the failure of a smithy would have national and world wide repercussions. But today, when an Ericsson capitulates to Qualcomm's CDMA, that does have world wide repercussions. When AT&T finally admits that it will start using CDMA, that will have world wide repercussions. When Metromedia Fiber starts charging by the fiber and not by the minute, that has world wide repercussions.

It is more difficult and time consuming to build than to tear down. The Telecom is building, most certainly, but at the same time it is tearing down the old world of communications even faster. Before the pain is all gone, the providers of the old have to disappear or change. As soon as people realize this, their selling of shares moves from orderly market to an avalanche where no one is safe. That is what has been happening since April of last year and most of us were too blind to see it coming. Even in the middle of the avalanche our hopes were shored up by the

promise of the new and we refused to understand the damage to our portfolios that the death of the old would have.

What does Kauffman have to say about it? As I said above, he never really thought about the stock market but he did think about complex systems in general and most will admit that the stock market is a complex system. A complex system is defined as one composed of many independent agents acting on their own with no master agent directing the action. The brain is a complex system made up of millions of neuron and there is not master neuron directing the traffic. Despite this lack of a central director, the brain works very well, thank you! I have written before about [Fitness Landscapes](#), also the work of Stuart Kauffman, and how the concept might influence the way we look at the stock market. But there is an even more important aspect to his work, the question of what makes landscapes frozen, effective in promoting fitness or chaotic.

Life has been described as order at the edge of chaos. Move into the chaotic regime and life would not survive. Move too far in the opposite direction, towards stability, and life would not evolve. Kauffman talks about NK landscapes where N is the number of members and K is the number of other members that each member interacts with. The maximum K is N-1. At $K=N-1$, all possible states are possible and you have maximum chaos. At $K=0$ there would be no interactions and the system would freeze, life would hardly evolve as there would be no co-evolution. Every member would only change based on random mutations. In the computer simulations that Kauffman and his colleagues have run, a fairly low K seems to produce the maximum level of fitness. At $K=0$, fitness is low. As K increases so does fitness but after a while it starts to decrease until the system becomes chaotic.

Let's see if this fits human history. In the middle ages there was very little contact between people. Hardly anyone ever traveled. Most people never moved more than a few miles from where they were born. There was also very little progress. During the Roman Empire, the Romans built roads and there was quite a bit of progress during that time. Marco Polo's travels brought many secrets from the East to the West including fire crackers and spaghetti to Italy. Maybe the Crusades sparked the Renaissance. There seems to be some kind of match.

At the beginning of the last century, when the automobile brought disruption, the

business world was not all that connected. There were few national businesses and even fewer world wide ones. At the end of the century, when the Telecosm is bringing disruption, the business world is highly connected. We have huge chains and world wide franchises like McDonalds. Big business is much bigger now than at the beginning of the century despite all the downsizing that happened in the last two decades. With the death of the Soviet Union and the death of Chairman Mao, two huge sets of countries have been brought into the world wide market. Let's face it, today the world wide K is much larger than it was at the beginning of the century and therefore it makes sense that today the business world is much more chaotic than it was 100 years ago.

Then there is the question of extinctions. Some of you may have heard about the sand pile experiments. You start pouring sand slowly on a table top and at first the sand just piles up. Later, as the sand pile gets steeper, you start getting avalanches. There are large and small avalanches but you cannot predict, when you add a grain of sand, if it will cause a small or a large avalanche. The same cause has various effects. If you plot the avalanches on double logarithmic graph paper, you will get a straight line which represents a power curve; many small avalanches and few large ones. Same happens with earthquakes, many small ones and a few large ones and no one is able to predict what will happen when. In the world of live species the power curve applies to extinctions as well. There are small extinctions all the time and there are a few massive ones at certain times, like the disappearance of the dinosaurs. Going back to the fitness landscape, when a species disappears, its place will be taken over by an intruder. Since this intruder's interaction with the rest of the species is so different from the original one, the fitness landscapes of all species changes so that their fitness is lower. If the change is small, most of the species will survive. If the drop in fitness is huge, then many species can become extinct.

How does this compare with the business world? The Telecosm is bringing huge changes just when the world is highly interconnected. A radically new species entered a world that was already more chaotic than was good for it. No wonder we have had the worst drop the NASDAQ has ever seen. On the other hand, the world of the DOW, which does not include many of the Telecosmic species it it, has been a whole lot less chaotic.

What should we expect of the future? Complex systems tend to move to the edge

of chaos where they can achieve the maximum level of fitness. The business world will do the same. It's too bad we don't know how and when.

The bible has a related story. The people decided to build a tower at Babel so high that it would reach the heavens. The bible tells us that God was displeased and that he created confusion by making the people talk in many different languages. Once they did not understand each other, they could no longer continue building the tower. What if we look at this story from Kauffman's point of view? When everyone talks the same language, K is high because many people can interact with each other. With a high K, the likelihood of chaos is also high. A common language causes chaos and the chaos is resolved when we speak many different languages.

Denny

"Demand creates queues. Supply gets rid of them."

[Software Times](#)