

## Order out of Chaos: I *I. Emergent Change*

The trouble with the term chaos is that it seems to imply a total lack of structure: an unintelligible, going-nowhere tumult which, when encountered, permits of no analysis or comprehension. Indeed, we seem to be equipped with a whole family of similarly desperate terms (such as Random Chance & Total Disorder for example) to affix to such incomprehensibles.

But, such classical chaos has these days been supplanted by a new mathematical Chaos, which purports to be very different - a form which can be delivered via particular equations and techniques, and which reveals a measure of pattern within the seeming turmoil.

It is not by chance that the initial ventures into this subject were in the field of Turbulent Flow.

Though originally such “break downs” seemed to promise a headlong rush into total randomness, it soon became clear that from the smooth, formally-dealt-with situations, such as **streamline flow**, quite other patterns could, under certain circumstances, come into being, which were, quite clearly, NOT at all random, but possessed a kind of rolling, changing form, which was fascinating in itself, and had to be explained.

If we carefully watch any streamline flow begin to dissolve into turbulence, it is immediately clear that what we have is a self-maintaining process as the normal, stable situation, within which any small disturbances are quickly re-absorbed with a return into the stable, prevailing pattern of flow.

BUT, as some underlying factors are further increased, the stability is successively undermined, and the self-maintenance of the old pattern can be lost.

Thus a new imperative could come to determine the “shape” of things, but when it did it wasn’t stable. Instead of a settling down into some form of new stability, the situation showed a sort of near-stability that seemed nevertheless to be tottering inevitably towards complete dissolution. Yet the new process would recur, except that the form would be slightly different on each succeeding cycle, in which the new forms – whirlpools of turbulence, were clearly evident.

Even then, the tenuous grip of the “new order” was neither established nor dissolved – at least close to the centre of the changes. A repeat with change became locally established, which as the main producing element moved away would leave behind a disturbance which would gradually subside completely. Thus, in the midst of the dissolution of stability, the norm would be for alternative stabilities to tend to become only partially, locally or even temporarily established.

Now, such a situation can be seen as the **precursor indicator** of the overthrow of stable situations generally.

Notice, though that the sort of situation that we are considering is not then, or ever, likely to subside into random noise. It is driven by the Flow, which, if anything, is getting stronger. With such an underlying imperative any changes will be consistent with, and driven by, this movement.

In the case of streamline flow into turbulence, it is a fairly simple and mechanistic example.

It is firmly “in the area” of mathematical Chaos, beloved of Mandelbrot and his many disciples. But, it is NOT the true and revolutionary kind of change-over that constitutes what is termed as an Emergence.

It is, rather, a purely formal precursor situation, which cannot itself establish any new Emergent Level. It is still wholly contained within its previous, *and still current*, Level. It is, if you like, a guaranteed-to-fail alternative. As such it is merely a precursor – an indicator only - and NOT a crucial activator of Emergent Change. It is associated with situations bordering on major Change, prior to any such Change being precipitated *by other more devastating factors*.

Clearly, such phenomena were very attractive to pluralist scientists and mathematicians, because they were totally amenable to their current approach and methodologies, and, even better, to easy computer generation.

Chaos researchers could crowd around their terminals, entranced by the totally unexpected products of their own programs. To them, there could be no doubt, they were dealing with the answer to all problems of development, and which were also clearly well within their philosophy of everything being governed by mathematical forms ALONE.

But, let us be clear, these programs could NEVER transcend the limitations inherent in their content. They could only explore the rough edges of stability, without ever crossing the Rubicon that is Emergent Change. There was, quite simply, not enough in their programs to precipitate an Emergence, and **there never could be!**

All the examples of this that I came across during my own researches into the area in the mid-1980s, clearly established this point. The vast majority were simply based upon a **single non linear equation**, and certainly NOT on any gamut of contending or supporting contributing processes.

NOTE: Now there is an argument which concludes that such non linear equations DO INDEED contain contending processes, but seen at a consequent level above. But, even if this were true the embedded content would never be sufficient to generate an Emergence.

So Holland and his associates at the **Santa Fe Institute** were (and maybe still are) clearly “on a rocker”. They will NOT, as is their avowed intention, simulate some sort of Emergence. At best they will become experts on the patterns on the beach, at the edge of a real, and prodigiously endowed, ocean of possibilities, their researches still anchored firmly on the land.

So, we must set aside such attempts as incapable of crossing the boundary of the old Level, and actually creating the new Emergent Level. Once more the case of the Origin of Life must be used to measure these ideas, for which it is my infallible means of judging such conceptions.

It is crucial to both see and reveal that at every stage the old pluralist methods are still steadfastly persevered with. There is no doubt that the attitude of literally all scientists is to believe that Reductionism is universally true; that explanations (read formulae) can and will take us straight through ALL such Level boundaries without difficulty. And this is held in spite of the main characteristics of an Emergent Level being such as to lose all our “banker parameters” from the lower Level, which are replaced by the creation of wholly new factors, which can NEVER be simply reduced to those existing previously.

(If at any point such assertions seem entirely arbitrary and in fact unproved, may I refer the doubter to our supreme arbiter – the Origin of Life on Earth). Is this assertion consistent with that stupendous Event?

Yet all these cul de sacs haven’t been a total waste of time. Though quite obviously NOT the solution to the problem, they DO make it clear that old stabilities are, in such circumstances, close to breakdown. Our attention is moved way from looking solely at how prior key parameters “produce” both the interim Chaos, AND the final resolution into a newly Emergent Level, and instead make us consider what other things might be the crucial, and indeed **directly causative, factors**.

The question is, of course, what these vital factors might be.

This will be addressed in my next paper on these questions

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