Memetics and the A Series (3)

In "Memetics and the A series (2)" we looked at the Hurst exponent, in an effort to use it in an A series context. Aside from the fact that the use of such concatenations of scalars was simply a tentative start - which could yet bear fruit - there turned out to be a lot of other problems, which were discussed. Rohani's efforts to use the Hurst coefficient for research purposes of not perhaps a pedestrian nature, but at least a conventional one, and the cries of woe of others (not the least Kaplan (Note 4) for example) has made it seem expedient for the moment to consider other avenues as well as the Hurst exponent.

Overall, then, and bearing in mind the difficulties, it was decided to look further, and also to look further at other people's ideas and conjectures. The most obvious thing to consider was the idea that throughout the literature was the 'strange attractor' idea, often applied to memetics. We mention for example R. D. Smith, Gabora, Combs and Rinaldi in this connection.

But first we note that Saperstein (1997) says - and his view merely echoes that of many others -"the paradigm of chaos was intimately associated with battle was certainly well known to von Clausewitz and the earlier Greek military historians. ..... do we gain anything from the visits of the soldier and statesman to the academy of the mathematician and physicist, besides some new, exotic descriptive metaphors (e. g., "strange attractor," "self-organizing criticality")?" ..." It is not evident to me that a single metaphor/tool—like chaos—is available or useful to us in dealing with a world system characterized by "complexity." Instead of specific new tools, these metaphors can contribute to the development of the new attitudes required for the more complex modern world. They can help sharpen minds dulled by a Newtonian world view so as to be alert to all new possibilities." Now whilst Saperstein's article is nicely presented, we are not really interested in pursuing "exotic metaphors"in this context.

We know more or less exactly (in mathematical terms) what we are talking about with the phrase "strange attractor" and that point must be strictly held to when we look at comments embedded in the literature.

That being said we summarise comments on Gabora (Note 1), Combs (Note 2), and Rinaldi (Note 3). Rinaldi seems to benefit us with more detail than most of these writers, but my words in the last paragraph apply, that is we are still not sure what he is talking about in precise mathematical terms.

Notes 1, 2, and 3 aside, out best hope seems still to be with Sprott and Puu if we want to use chaos theory. It is probably plain that I consider the other work above as mainly largely too speculative to take extremely seriously. But the papers listed in "Supplementary References" below, and some of the work cited in Part (2) are (or should be) worthy ones. And even if they are sometimes having little obviously memetically applicable content, they help to build up a picture for further work.

Walter J. Freeman (1991) claims to have found strange attractors in EEG results concerned with the olfactory system, again not too surprising as they are nowadays a simple result of basic maths. He says : "The images suggest that an act of perception consists of an explosive leap of the dynamic system from the "basin" of one chaotic attractor to another; the basin of an attractor is the set of initial conditions from which the system goes into a particular behaviour. The bottom of a bowl would be a basin of attraction for a ball placed anywhere along the sides of the bowl. In our experiments, the basin for each attractor would be defined by the receptor neurons that were activated during training to form the nerve cell assembly. We think the olfactory bulb and cortex maintain many chaotic attractors, one for each odourant an animal or human being can discriminate. Whenever an odourant becomes meaningful in some way, another attractor is added, and all the others undergo slight modification."

He goes on to say "One profound advantage chaos may confer on the brain is that chaotic systems

continually produce novel activity patterns. We propose that such patterns are crucial to the development of nerve cell assemblies that differ from established assemblies. More generally, the ability to create activity patterns I may underlie the brain's ability to generate insight and the "trials" of trial and-error problem solving." and "We have found widespread, apparently chaotic behaviour in other parts of the brain." Freeman's theories are currently regarded, in part at least, as unproven and controversial (Bear, 2001)

Lucas (2002) goes on to elaborate the idea into a complete mental (but rather short on detailed maths as presented) scheme but at this point I feel it not necessary to follow suit. By now Tsuda (2001) and many others have also amplified the strange attractor idea into an inclusion in fully fledged brain descriptions.

Well there is certainly not a fully accepted model of the brain as is shown by the multifarious other brain theories available, but it does rather leave the way fairly clear to work out some kind of memetics approach within the A series, and realistically using chaos theory and (perhaps) strange attractors, as we are not bound to find an equation for individual neurons but just general effects, importantly within the A series, and in a way which could also encompass Hurst coefficients.

So if we are to produce a result it may prove best to try to neither achieve a major global nor a highly specific result to start with, like the number of terrorist bombings in a certain area. I did do some sums on such matters but so far, like Edmonds, do not see a very clear way ahead there though I appreciate the work of Gatherer and others.

To recapitulate, we did suggest in an earlier exercise (Yates, 2006) that by suitable primes, it was possible to arrange for a subject to have a particular dream, not a ordinary one but one dependent on future events not considered by the subject in advance. This followed on our earlier dissertations on dream psychology where we noticed that Professor Stickgold could produce dreams, almost to order, in at least some subjects. So the reasoning was, if he could produce dreams after stimulation, would we be able to produce some dreams before stimulation. I also pointed out that there were going to be some knotty problems in interpretation and in repetition of the phenomena. At this point the sort of objections which arose could almost be of the order of those which arose with reference to Asimov's early joke paper on the imagined substance "thiotimoline".

Having made that experiment work on dreaming ahead of the stimulation to dream, I then looked (as indeed I had done before) for factors related to such predictions, which I found even in Professor Hobson's work and again we must carefully point out that he certainly is not of the Freudian or Jungian school, and has always taken a very down to earth view on dreams as can be told from his many books and papers, cited elsewhere in these blogs.

In Part 2 of this paper I outlined the difficulties with experiments on objects and animals. Then the next stage may be to look at memes of a nature which may relate to human beings. There is a large amount of scientific, quasi-scientific, sociological material and so on. For the moment my approach follows that of Sprott to a greater extent than the not dissimilar view of Guastello (Note 5) for various reasons but a principal one seemed to be that it looked relatively easy to me. We leave Freeman's ideas in our pocket for the moment but I will again stress the idea that "the map is not the territory".

From our standpoint, we can refer back to Gale's (1967) excellent anthology of some of the work up to that time, and notice that on p69 he gives three differing ways to deal with McTaggart's paradox these being

(1) The B series alone is enough

(2) The A series alone is enough
(3) either the A series is enough or the B series is enough but they must not be confused with one another.

Now I take a fourth view and that is that we need a B series (which roughly speaking, and exceptions aside) does for physics and an A series which on the whole we use for human perception and other matters, like the possibility of an immortal soul. But both A and B series are required, and often enough they use similar mathematical techniques. If we are not diligent we can certainly fall into philosophical and, depending on the nature of A and B series, mathematical and logical problems. This is a newish view not considered by Gale and other workers. Certainly it would be unwarranted to assume a simple mapping between A and B series as I have indicated in detail in earlier blogs, hence avoiding McTaggart's paradox.

But even within the A series, we are best not generally assuming that "the map is the territory" and if we are careful there is no need for an infinite regress.
To put it very simply, we see things we think we know should be found in an A series,we try to identify them (as we did with the Hurst exponent in "Memetics and the A Series (2)" for example) and then we describe them in terms of the A series. This of course normally may require mathematics but we have to be careful that a past, present and future are involved. This will give us an A series or a pseudo A series written after the form of a B series at worst.

Its very hard to know how far we can go with these pseudo A series in my opinion.

One thing that can be done is to try to extend non-linear dynamical psychology. First we note two very interesting recent cases of that by Sprott (2004, 2005). These involves such things as a mathematical description of Love and Happiness and this is really quite a clear mathematical example to the point where it is used by Strogatz (1994), Speigelman (1997), Parwani (2001) and others to provide elementary/advanced training courses in chaos theory, catastrophe theory and the like. Somewhat similar work has even been done on the Mexican wave (Farkas, 2006).

Most of this is welcome enough, it seems to me. But we need more useful attempts to universalise the phenomena and specific figures for actual events are often lacking, although some figures appear in the work of, for example, Jones (1995) , Helbing (2000) and Aks & Sprott (2003). The latter paper is interesting for two reasons : Firstly it goes into much detail on the Necker cube phenomenon (which of course is like the duckrabbit discussed in the earlier blogs) and secondly insofar as it applies directly to neuroscience and we are left musing the comment "During the last decade, it has been established that a large number of natural systems containing several interacting individual components have statistically similar dynamical properties, ***independent of the particular details of the system*** (italics mine). Examples include earthquakes, population dynamics, DNA base sequence structure, epidemic outbreaks, and various cognitive and reaction time behaviours. Examination of the statistical properties of these system fluctuations has revealed dynamics with well-defined generic scaling properties in the form of power laws .... etc". We bear in mind the Packard-Ruelle-Takens method and also Aaronson's (2006) recent comments about the universality of NP-complete results, considered since the early 1970s.

But the work of Aaronson (2006) makes it clear where conjecture can lead simply to disaster and at least in his flamboyant exercise in that paper, he clearly seems right into the B series when he speaks of quantum computing and there are problems there, when serious attempts are made to express directly in terms of the B series, ideas that in fact seem to come from the A series.

Strogatz (1994), Sprott (2004, 2005), Jones (1995) Spiegelman (1997) and Parwani (2001) seem to be writing largely in A series terms but flowing over to a limited extent to the B series, whereas the

problems in this sort of position come out clearer in Aaronson's (2006) work I think. Aaronson takes a great interest in quantum computation so this effect seems normal, natural and almost expected. In fact Aaronson's (2006) exercise in places looks a bit like one of Sprott's (2004, 2005) exercises on love and happiness gone wrong, perhaps with some humorous intent by Aaronson but it seems to me close to the amusement often allied with bizarre and important curiosity. One of my own pet slugs seemed to show such amazed curiosity when I put down extra food for it last night, but perhaps I anthropomorphise there a bit too much.

We need to bear in mind that some, if not all, of these A series uses can be construed as *faux*-A series. That is in the sense that some peope would claim to find similar B series results in one way or another. But we must bear in mind that we have tried to find things that we know we would expect to find in an A series, identify them, describe them and try to use them. And we really need to distinguish two things from one another. Firstly, is there a difference between the A series and the B series ? Secondly, are certain items, for sure, A series or B series? Now we can be sure on the first query. The A series gives us a past, a present and a future and more, while the B series perhaps gives easier mathematical conjectures. Roughly like the difference between tensed time and tenseless time. There is a difference between A series and B series. On the second query, usual physical 'rough assumptions' (no worse than say renormalisation problems) can always appear at the present state of the art. Certainly some items or manipulations clearly seem one or the other but as elsewhere in life there are margins of doubt. At the moment we are probably at least no better off than physics was on mass renormalization without the RG groups.We do know, though, that an inappropriate mix of A and B series will lead to paradoxes according to McTaggart.

Well now we have indicated at least some of the ways the A series may be used. There definitely seems the groundwork for further progress now.

For example there is beginning to appear ways, at least in principle, how an element of precognition could be detected. Typically dream precognition has been said to be related to intense emotional experience. It has to be stressed that at the current state of the art, no seriously satisfactory evidence other than anecdotal is available and an open and rather sceptical viewpoint has to be considered for that, but of course there are countless anecdotal cases which claim precognitive results in cases like 9/11 .

In the case of the experiments that we have done, it is true that we obtained positive results. But we would certainly like to obtain a series of independently controlled trials to the same effect. With direct mental involvement particularly, this may not be easy. The feeling is that usually results evaporate when supervision and scaled up psychology experiments are tried for anything so ambitious. The earlier work in this blog has tried to find out why positive results even for very large and clear systems take so long to emerge. And more often than that, these involved simple models like the solar system, physical rather than obviously psychological. Stanley Milgram, whose work I greatly admire, was one of those who was able to stand by his results in experimental psychology, to world acclaim. On the other hand some effects, even when they are physically obvious on examination, may simply remain as 'anecdotal' and be suppressed in the way results regarded as 'currently unfavorable' so often are. For very straightforward esperiments sometimes this is clearly this suppression is often dispensed with quickly. We look for example at early repetitions of the Milliken oil drop experiment where some results were clearly suppressed. And we earlier in this blog mentioned chemical reactions, where results dependent on chaos were simply apparently omitted as not falling within the limits which experimenters would have expected. And then of course we have the almost-parable of Semmelweiss.

Here we are not witch-hunting in advance - but we bear in mind that many of the early Rhine experiments are now regarded as fraudulent after clear admissions by their practitioners and other

experiments on children as apparently involving pedophilia also have perhaps to be excluded, though that it seems that 'pedophile' is now a current cry by small children resisting arrest by the police,whether their complaints are true or not. I'm all in favour of doubt to the level of people like Randi but we do need to be sure if and when it is justified given the circumstances.

We looked at somewhat dubious and borderline work such as some experiments on 'synaesthesia' and earlier in this blog I have mildly queried some examples, done interviews of synaesthetes and experiments on them and tried to estimate roughly the apparent present state of the art in that field. The Perky effect appears also to be borderline but the evidence is still not all in, though some hazard a guess that most of it is. And now we are left with the matter of near death experience. I have spoken to Dr. Peter Fenwick about this and he seems to hold a very positive point of view, and Dr. Bruce Greyson also suggests that there may be much evidence available which has not yet come in but allows that consideration of NDEs may also have a psychotherapuetic value. Now I have unfortunately in my blogs made things a little more difficult as I have pointed out that hitherto considered but then omitted cases of NDE may actually be part of evidence of a striking success in discovery of NDEs !

I do not ignore the many apparent continuing successes in ESP and such like and certainly Dr. Fenwick mentioned some of those to me. However other people, often very eminent ones have very negative opinions on ESP and such like. At the moment therefore, I feel that it may be contentious to include these issues in a program. Dean Radin's (2007) work, for example, is well known but I enclose a current Wiki URL on it which is very negative at time of writing, and illustrates the problems which anything unusual tends to have, often for good reason.

Experience here suggests certainly with dream precognition that some direct involvement with brain action, after the precognition, possibly occurs, if there is any precognition which I am not prepared to gamble on. The cases described here of course simply used omething like the computer game technique pioneered by Stickgold and mentioned above, but that clearly involves a lot of brain action. In many of these cases it is so easy to set up a large series of controlled experiments and I am not yet convinced as to how they would be best best operated. It would not have been good science, for example to try to claim that nobody can carry out extremely rapid mental calculations and in doing so ignore Ramunjan, Erdos or others in the small class of savants. So using the mathematical techniques used in this article as above, exemplified typically by Sprott (2004, 2005) a more detailed presentation may develop, perhaps in later blogs of this series.

I would suggest that there is still a good deal of work to be done even on very simple cases like dream precognition which seems to do no more than show some A series influence, and near death experience which may do the same and for the moment these seem like the most likely success cadidates.

The "rotters and scoundrels" in the case of the existence and relevance of the A series, happily seem to be conventional physicists as everyone else would seem to see that we do each have a past, a present and a future, and that some people do believe in free will and God. To not admit that can lie on the borders of solipsism, and even madness, and if physicists persist in their views we can draw our own conclusions. But it could be argued that the jury is still out on contrived dream precognition.

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Notes

1. Gabora (2001) "Abstractions are not only driven by the memetic fitness landscape, they feed back on and actually alter its topology. Much as the evolution of rabbits created ecological niches for species that eat them and parasitize them, the invention of cars created cultural niches for gas stations, seat belts, and garage door openers. As one progresses from infant-hood to maturity, and simple needs give way to increasingly complex needs, the trajectory of a stream of thought acquires the properties of a chaotic or strange attractor. The landscape is fractal (i.e., there is statistical similarity under change of scale) in that the satisfaction of one need creates other needs. This is analogous to the fractal distributions of species and vegetation patterns described by ecologists (Mandelbrot[60], Palmer[69], Scheuring & Riedi[83])."

Now this sort of thing is all very well but there seems to be no clear reason why such an analogy may have direct mathematical meaning. And I further point out that attempts are made to drag quantum mechanics, still a useful buzz-word, into all this in Gabora (2007). I would say that whilst this may be a brave attempt at interdisciplinary study, I have expunged similar work from my files since the days of G.D. Wasserman and his field theory about ESP. Call me a sceptic if you like, but sometimes I can understand why David Deutsch seems to get upset by people like Brian Josephson, who really should know better, possibly unlike Gabora who is really just having a rather flashy try. And hard scientists can ponder (a little bit) on her stuff - should they choose.

2. Rosicky (2006) says: "Combs [2002] explains cognitive/mental processes by term (chaotic) attractor – processes on the edge of chaos reach over two dynamic stable states - Lorenz's strange attractor." The rest of the paper is not completely clear. So let's try Combs. Combs (1995) says "To my mind Tart's ideas are of the first order, but can benefit from more recent advances in the sciences of complexity, which yield more dynamic and fluid conceptions of the nature of systems. For example, a state of consciousness can be reconceptualized as an attractor. Speaking informally, an attractor is a condition to which a system is drawn by its own nature. If a cup is placed slightly tilted on a table, it will roll about in a spiral till it comes to rest standing up. This latter condition is termed a static attractor, because it represents the static position to which the cup is disposed. More interesting are cyclic or fixed cycle attractors. The human heart, for instance, runs through its cycle many times each minute. The moon passes through its various phases each month. These, and many others, are instances of systems that naturally settle into predictable cyclic routines. Most interesting, however, are the class of attractors that are neither fixed nor precisely predictable. These are termed strange or chaotic attractors." As for Charles Tart, you can get opinions on his work from http://skepdic.com/tart.html . So Combs uses the ideas of Tart - not necessarily all incorrect - to suggest that a state of consciousness is a chaotic attractor, bringing in many elements to coalesce to a unified pattern.

Combs may be on better ground when he brings William James's ideas into it and suggests consciousness is "a constantly changing process, clearly not static or even following a fixed cycle, but nevertheless one that has an identifiable global character, at least for each individual. Memories come and go, thoughts pass through the mind only to disappear and return again later, moods are continually changing, and alertness and energy levels vary from hour to hour. These are the

elements of a kind of mental soup, or more accurately a kind of mental weather, with the equivalent to the latter's constantly fluctuating temperature, humidity, wind, barometric pressure, and so on".

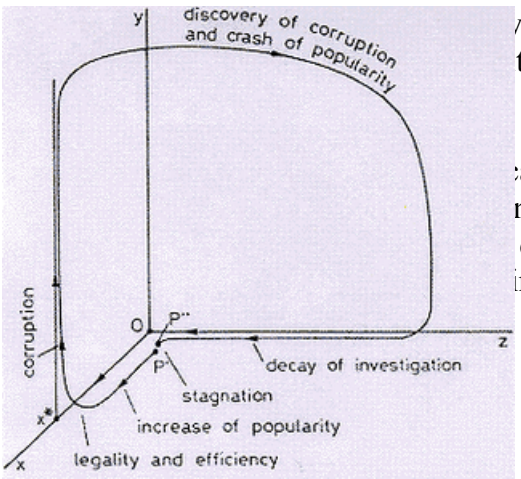
So in essence Combs is saying that, like the weather, consciousness may be represented by mathematical equations and some of these may arise from chaos theory. Now many simple equations need chaos theory to represent them, as Sprott's book (ref in Part 2) makes clear. And it is clearly fair to say that a chaotic attractor may thus occur in some of them, equations being what they are.

Combs then says:"It is not surprising that weather is chaotic. Indeed, the elements that comprise it, such as temperature, oscillate in an identifiable cycle from day to day, but cannot be predicted with precision. What is more, it is unlikely that temperature fluctuations ever follow exactly the same course on any two days. Much the same can be said about mental weather. It is formed of the interaction of elements such as moods, thoughts, memories, and so on. These are Tart's original psychological functions. For some, such as moods, there is already empirical evidence that they are chaotic (e.g., Combs, Winkler, & Daley, 1994; Sacks, 1973/1990; Winkler & Combs, 1993), while virtually all are consistent with the general description, above, of chaotic processes. As a group, their interaction, like the interaction of the elements of the weather, yield an exquisitely complex process fabric that we know as consciousness. This fabric is far too complicated to describe in detail, but efforts have been made to mathematically conceptualize it as a grand chaotic attractor."

Apparently consciousness, on such models, is to hard to conceptualise in detail. But Combs perseveres "If the system gets stuck in the attractor of a wrong solution, subsequent recall will be incorrect. What is needed is a process that keeps it from settling down too quickly in the first attractor basin that comes along. This process is chaos. One can easily think of it as operating in a similar fashion during the search for a solution to a mathematical or linguistic problem, or a quest for the right artistic expression. Chaos is the antidote to stasis and stagnation."

But we still need a detailed mathematical description of what is going on. As such writers do, Combs says much more, in various places, but that is a brief gist of it. Rinaldi perhaps enlightens us with more detail which we describe briefly in Note 3.

3. R.D. Smith (1998) is good enough to enlighten us as to Rinaldi's (1994) thoughts: "In order to have a formal notion of structure which is consistent with the chaos theory paradigm we now need to return to a requirement so far unelaborated. In its most precise rendering chaos can only arise when the possibility of any given state repeating itself is potentially zero. To take the illustration of a strange attractor such as the Lorenz attractor (as in Figure 4) what is needed is a situation in which the orbital pathway of a flow or flux can continue for an indefinitely long period of time (for eternity) without ever passing through the same point twice. If this condition is not met then the orbit is not in fact chaotic but periodic even though highly convoluted. What this in turn means is that the phase-space in which the flux is propagated should be continuous and not quantised. A quantised space (says Smith), however large, is effectively finite and thus cannot provide for truly chaotic behaviour. Other more deductive approaches to large-scale pattern identification can also be



ve produced the following application of 'strange attractor'
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al description also due to Rinaldi. Smith also mentions the
mewhat similar to the spotted dog against a spotted
distinguished by the human eye. To his great credit Smith
nism and Mechanism before it, has the potential to be

transformed into a metaphor and to have its terminology misunderstood and misapplied". And that is what we must be sure not to do here.

4. Ian Kaplan says in a long useful URL "I thought that the Hurst exponent calculation would be easy .... Sadly things frequently are not as simple as they seem"
http://www.bearcave.com/misl/misl_tech/wavelets/hurst/index.html

5. Guastello says "First, we should not become overly preoccupied with its (NDSs) [nonlinear dynamical systems] principles of system connectedness at the expense of forgetting the basics – attractors, bifurcations, chaos, fractals, self-organization, catastrophes, and so on"

"Before basic NDS, change was understood in the social sciences as only one amorphous entity – change."

"It is also historically important, in my opinion, that two of our most central concepts, chaos and fractals, originated about a century ago when aviation was in its infancy and the very first papers on rocket science, not to mention the Theory of Relativity, were being published and discussed. In our travels we picked up nonlinear topology, information and entropy concepts, catastrophes, and self-organization; by the mid-1980s had begun to see formal connections among all these systems phenomena. Given the time horizon involved, it is doubtful that post-modern philosophy can claim with a straight face any more credit for the scientific developments than perhaps generating a little more interest than what would have been the case otherwise. It is also doubtful that any philosophical genre could claim more credit than any other genre for having discovered creativity itself."

In my opinion this is very true and by using McTaggart's paradox I am trying now to rid us of the Tychonic illusion and present us with time travel and immortality.

Guastello then goes on to say "where it has been possible to compare the accuracy of nonlinear and linear models, and the nonlinear model was adopted as the conclusion, the average ratio of variance accounted for was 2:1 in favor of the nonlinear model (Guastello, 1995, 2002). This is obviously a utilitarian riterion of success."

Fair enough. and here I must quote one of the many papers in the field by McSharry (2005) as to likely problems (but which also offers some methods) which have occurred in the past to these methods, and may occur when applied here.

" With the discovery of chaos came the hope of finding simple models that would be capable of explaining complex phenomena. Numerous papers claimed to find low-dimensional chaos in a number of areas ranging from the brain to the stockmarket. Years later, many of these claims have been disproved and the fantastic hopes pinned on chaos have been toned down as research with more realistic objectives follows." etc etc

Guastello's approach is outlined in Guastello (2006) and is well worth considering but there are difficulties in its complexity of arrangements