

>> >> >> From: Phil Henshaw <<mailto:id@synapse9.com>>
>> >> >> From: Stanley N. Salthe [<mailto:ssalthe@binghamton.edu>]
>> >> >> Sent: Saturday, August 11-18, 2005
>> >> >> Subject: RE: it seemed so familiar

Phil 1. Hi Stan, it's been so long. How are you! I was browsing on a web page and the ideas seemed remarkably familiar, something about overlapping systems sharing parts. I've put the work down and picked it up again a few times since trying to engage SGSR [1984-6]. During one phase I focused on pattern recognition software tools, and I'm doing more short opinion pieces now. I still think the key is system identification. We need to learn how to watch them work, and my handle is still growth. Growth curves locate and identify rapidly evolving open systems. Here's this week's sample... A really quick study

Stan 1. Hi Phil. I don't find "this week's example" in your posting. Anyway, I'm doing well (aside from allergy hell). Been working thermodynamics mostly recently, and publishing in both ecological and systems journals. I now consider myself as being in Philosophy of Nature (see my pages at www.nbi.dk/~natphil/salthe/)

Phil 2. <http://www.alongshot.blogspot.com>

Stan 2. Phil -- OK. I see your point. I guess you know that I tend to be sympathetic to your perspective here.

Phil 3. Thanks much. And I yours, though I tend more to empirical work, defining things more by 'look here' than verbally. Not that I haven't tried... Did the version of the Crimewave piece you saw include my discounting the reported correlation with abortion? I think there's no surprise that the same areas of the country show the greatest 90's decline in crime and 70's rise in abortions. They both naturally match the locations from the 60's where the crimewave erupted in the first place...!

Stan 3. Quite interesting!

I) Boundaries

Stan 4. Scalar hierarchy theory (Salthe, 1985, "Evolving Hierarchical Systems", Columbia U Press) tells us that there are entities self-organized at many scales. We are clearly units within larger such systems, like cities, firms, etc -- possibly, as you suggest, episodes. These entities' boundaries are not obvious to us naively.

Phil 4. Nor, I think, do the boundaries exist really, except conceptually. Open systems are mostly really open aren't they? That's why identification is so difficult isn't it?

Stan 5. Well, this is tricky. Consider that at small enough scale, the boundary of your skin would be vague indeed. If episodes could be viewed from a large enough scale, who knows... Consider explosions -- pretty definite, don't you think?

Phil 5. Yes, some boundaries are invisible from some perspectives, so you should look around. And the word refers to what a natural boundary actually is, not the ideal of boundary that never actually exists. But I think there are

lots of open systems which are actually very open, where their parts are not exclusive and may participate as parts on several systems at once. Say I'm on the football team and the basket ball team, both of which are socially tight in themselves but have nothing to do with each other. Where's the boundary? in time? in space?

Stan 6. OK. It is certainly the case that an entity (from some perspective) could participate as a component of more than one larger scale system. There is no reason that boundaries cannot interpenetrate. For some purposes they function as constraining boundaries, for others not. Context is important in scale hierarchies -- the hierarchy is determined by categories of the highest level.

Phil 6. The physicists are always referring to 'the system' as their equation, and I use the dual view that it's both our explanation and the physical thing, since it's the latter that does the doing.

Stan 7. On this head, I make a distinction between the World and our model of it, Nature. I think we all deal with Nature, our own construct -- even in the testing of theories, because tests are themselves constructs -- the word made physical!

Phil 7. The boundary all systems would seem to have is the internalized web of relations, whatever parts take part in it in whatever way. Once you have the relations (and relations of relations), yes, that implies where the boundaries in the models should be set.

II) Trajectory/Curve

Stan 8. Thermodynamics shows that material entities show a (what I call) the canonical developmental trajectory (immaturity -> maturity (in more stable cases) --> senescence: Salthe, 1993, "Development & Evolution", MIT Press). You are here suggesting this pattern for an episode. I guess that, as long as it is driven by energy flow, AND has some way of accumulating information (senescence is in my account caused by information overload), I see no objection to your view.

Phil 8. Yes, I look at things as 'episodes', bumps on a curve, events, lives and their stories. I think the device is very useful. For one, I use the signature organizational phases of growth, the 'canonical developmental trajectory', to identify them. It's an internal function they all go through and it's fairly easy to identify from the outside.

Stan 9. Yes. I have yet to find a process or episode that doesn't, at least roughly, show this pattern. I think of it as a 'law of matter'.

Phil 9. because all curves are made of dots it's always a matter of approximation certainly, but a transition from dots as separate things to dots as one thing, moving from discontinuity to continuity. I suppose you could imagine a special case where dots becoming a curve without inflationary growth being involved, but it always seems to be involved.

Stan 10. Again, if you ever find a case that obviously don't fit, be sure to let me know!

Phil 10. yes, I'll be sure to make a point of it. The one regular candidate seems to be the starting seed for system

events. It's generally indistinguishable from the noise at the inception of system growth, but the whole elaboration of the system appears to follow from it quite directly. Is there anything there or not?

Stan 11. The starting seed has as yet had no opportunity to display the pattern we're looking for. Perhaps, if we drop down in scale, we would see a micro development in the seed leading to the development we are awaiting. Also, it can happen that the canonical pattern leads, in senescence, to a renewed, but much slower, growth pattern of the same kind rather than a crash, forestalling the end stage.

III) information

Phil 11. To me growth phases are also direct evidence of accumulating or demolishing information, though I haven't recently worried about how.

Stan 12. I think "demolishing info" is a major problem. Info ain't so easy to get rid of! If we have X, then deleting, we have something: exX, -X, fromX, and we build from that. This is why/how IMO senescence devolves of information overload.

Phil 12. Oh, certainly disassembling a formerly working structure creates new complexities. They might eventually become compost. I was thinking of information about the system being destroyed in the disintegration and then decay growth phases.

Stan 13. So, then, as a system gets recycled its information gets scattered about. OK.

Phil 13. Usually returned to medium of exchange for recycling in some way. One can treat information as being what you would have to say to explain the whole history of how the scattered results developed. I'm more interested in what I'd call useful information, what the resulting bits might be used for. Partly broken bits may be more useful to more things than whole bits.

Stan 14. So dispersed and disrupted informational constraints could be incorporated as new informational constraints in a new system.

IV) Couplet/triplet

Phil 14. I think it would be imbedded throughout the whole, defining its 'inside'. One would also have to recognize a component residing in its reliable open association with others, i.e. in the supporting environment. Is that a necessary couplet, a yin and yang of information structures?

Stan 15. I think it more a triplet, as in [supp. env. [process [initiating conditions]]].

Phil 15. don't follow.., the system has an inside order which contains a mirror image of the environment, and the environment contains mirror images of all the systems that reside in it. where's the 3rd?

Stan 16. Well, consider, e.g., a living cell. Its dynamics (e.g., cell division, etc.) are being followed. Initiating conditions for this are generated at the macromolecular level within, while its context (organism, colony, pond) is in

reciprocal exchange with it: [organism [cell [macromolecule]]]. Any system can be parsed this way. Dyads are not sufficient for full understanding in most cases.

Phil 16. my original studies were of air currents where you typically start from an undifferentiated void, uniform but unstable layers of fluid. Then energy transport eddies with internal organization spontaneously appear, along with contextual organization to accommodate them. I never did find out if there was a cellular structure to them, but let's just say there's only molecules & particles. Maybe the interior organization of the molecules are remotely affected by forming an eddy, but it's speculative. In that case there's just the interior and exterior organization, right.

Stan 17. I've been thinking about tornadoes and hurricanes a lot. These are the "organisms" of physics -- indeed the likes of these would have been the physical precursors of organisms! I always find the triad of levels. Let's see: [macroscopic arrangements of temperature/moisture [mesoscopic convection [molecular conduction]]] Say -- whatever happened to your droplets running down the windshield?

V) Climax/aging

Stan 18. I briefly worked with a psychotherapist whose records definitely showed the canonical developmental pattern -- a slow beginning, followed by rapid progress, which gradually slowed down to ho-hum boredom. As well, George Soros' book "The Crisis of Global Capitalism" shows that the business cycle follows the same pattern. So, I guess I tend to follow your view.

Phil 17. I see a little more interest in the 'boring' part. The gee whiz inflationary growth part gets all the attention, but the maturation phase is where the refinement to perfection is done (the honing-in which follows stepping-out).

Stan 19. I agree. I think senescence needs to be much better understood in general, and, indeed, COVETED.

Phil 18. do you use 'senescence' for both negative feedback periods, maturation and decay?

Stan 20. It is post maturation, after a system has become definitive for its kind but continues to exist. In dynamic systems, its per unit energy flow is diminishing and so recovery from perturbations diminishing in likelihood. It awaits recycling.

Phil 19. so it's a kind of wearing away of the mature system's resilience, making it progressively more vulnerable to cascades of breakdown?

Stan 21. Exactly. But I think we need to understand it better inasmuch as our global human system will of necessity (information glut, energy flow decreases) be moving into this stage. How can it be prolonged is a key question.

VI) Growth limit

Phil 20. Do you see the inflationary phase as self-destabilizing (that the seeds of the succession can be internal)?

Stan 22. I see the inflation as strong willed, riding on fast work/maximized entropy production, and, yes, guided by internal constraints. These later get overpowered by external fluctuations in senescence, after the unit specific energy throughput has dropped as a result of interference by overloaded information.

Phil 21. I think one of the special innovations of living things is premature growth climax, occurring prior to otherwise inevitable exhaustion or confusion. I think the latter would surely happen if there were not internal triggers diverting the growth feedback to other things at the self-chosen point of maturation. My big concern about the world is that we're headed for confusion due to a lack of self-constraint in economic growth.

Stan 23. You and everyone else I'm in contact with. Yes, that's the problem. The system is being kept artificially immature (at cost to the future) so that the 'growth economy' can continue its mad rush. I have been advising that we try to understand, and deliberately move into senescence, but even the word turns folks away. A couple of colleagues have searched for a better label, as yet unsuccessfully.

Phil 22. Well, maturation isn't the end for an open system. It could just be taking a breather.

Stan 24. Yes. Sometimes renewed growth becomes possible in a different direction, or as a result of information loss (if that were possible). But, generally, sooner or later this stage must be faced.

Phil 23. In biological evolution new species are replaced with new species.

Stan 25. It seems that many now think that speciation events mostly follow upon disasters -- information losses.

Phil 24. The main thing is that with economic climax the lives of people can continue to be highly stimulating and rapidly evolving (as that seems to be what people want)

Stan 26. OK. "Evolving" could be possible even if not carried by further growth and development, but I think the problem here -- once again -- would be how to delete information from the system so that it doesn't get into extreme overload.

Phil 25. as long as the level of investment in change doesn't dwindle. Continuously growing investment is what isn't needed and highly destructive.

Stan 27. Yup.

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>Phil
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>> >> Best,
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