

Wunderkammer II



Susannah and I just went canoeing with some friends through a flooded forest. So wonderful. We saw coots and a horned owl, and whirlpools where submerged culverts were still trying to do their thing. It was very still water, so the reflections of the trees made the whole thing surreal; boats drifting through a void of tree-trunks.

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I was recently told that I need to network better, which is undoubtedly true. It is probably indicative of my poor attitude towards networking that in my mind, writing a document like this and posting it on my website constitutes “networking”, though far fewer people will see it, at least in the short term, than would have seen a cat video I posted on social media. We might even call blogs of this sort “asocial media”; it’s sort of one remove away from writing something and then hiding it. A recent observation, apropos here: living in a rural area is the geographical equivalent of not having a Facebook page. At its best, though, this farm has often felt like a nexus of people, a networking hub, despite being in rural Vermont. When we have guests, as we do now, it still feels that way. But for a long time we have been turned inwards, focusing on disease and dementia and caregiving and our own stresses. In that mode, the farm feels very isolated and isolating. Anyway. I should keep in better touch with people, and I should network better, which I think is management-speak for the same thing, and if I’m not doing that, please know that I do intend to.

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I need to add a fairly general item to my list of popular words and phrases that irritate me. This is the use of “people on this site” or just “this site”, or the equivalent, to generalize about websites that are not topically specific. I’ve seen it on Tumblr, Reddit, many forums, and other places, but it is especially striking on sites like Facebook, Twitter, or Tumblr. In these instances, the content experienced by any given user is strictly a product

of whom they choose to follow. Depending on those choices, “everyone on the site” is a neo-Nazi, or a vegan, or a genderqueer anime buff, or whatever you like. So this sweeping, passively-voiced complaint about the herd is in fact, *quite specifically*, a reflection on the speaker.

A less annoying variant has to do with Google searches and a few similar algorithms that incorporate recommender algorithms. Once upon a time, the results of a Google search may have been a static “text”, like the front page of the New York Times. No longer. Now these sorts of things are all [subjective texts](#), which renders painful all the discussions about how “*when you type in hen Google suggests hentai!*” or the like. No, dude. That's just you.

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Snopes has just posted a discussion of the [alleged fish rain](#) in Thailand. “Strange rains” are a mainstay of Forteanism, and they are very dear to my heart. Fort was a madman, of course, but he was playing a long game of epistemological outrage against the [pseudoskeptics](#) of his era, rather like the [Zetetics](#) do in ours.

It is nice to see that pseudoskeptics are on the job, and with such zeal for the cause of science that they could not even delay for a few moments to get the facts. As the Mikkelsons note:

“Some media outlets tried to give a scientific explanation for the fish rain, claiming that ‘Monsoon winds lifted the fish from the river and the Indian and Pacific ocean..’”

We might note, for bonus points, that mid-March is not even in the ballpark for “Monsoon winds” in Thailand. But that's a quibble. In fact, the fish had spilled out of the back of a large truck. A similar story about [a rain of earthworms in Norway](#) has followed, with a similar amount of dilute, quasi-scientific explanation. I have to side with Fort on this: there is no empirical reason to believe that normal weather events, pick up large quantities of specific animals (or wool, blood, Chinese pottery, etc.), lift them overhead, move them laterally, and drop them somewhere else. This is simply not something that has been observed. We can suggest various alternatives—I would guess, for instance, that Norway's earthworms aren't falling any further than Thailand's fish. But that isn't the point. *Scientists* and their cheerleaders should not be offering us a just-so story about subtle earthworm-and-fish-specific off-season-Monsoon whirlwinds that no one happened to notice.

Aargh.

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Liamorra is simultaneous-move perfect-information game, closely related to the prisoner's dilemma, but played by three or more people. Each player simultaneously “plays a number” up to a certain maximum. Usually this is done by displaying zero to five outstretched fingers. The player with the highest *unique* number wins. If there is no winner, the game is repeated, but analytically it is more interesting to assume that the game will be iterated, anyway.

Liamorra falls into a fascinating (to me, at least) class of games that do not have an optimal solution, since the optimum move depends *entirely* on correctly predicting the other players' moves. This is in contrast to games like tic-tac-toe or chess*, in which certain moves can be strategically advantageous or disadvantageous regardless of your opponent's strategy. The optimal solution for Liamorra, as for the iterated prisoner's dilemma (IPD), depends purely on the suite of strategies that are employed, and these can in principle be endlessly complex.

That said, certain algorithms, such as Rapaport's *Tit-for-Tat* in the IPD, seem to be empirically successful

* But is this true of chess? It seems almost trivially obvious, yet chess is far from a solved game, so perhaps we shouldn't be too sure. When I've replayed chess games by grandmasters, the moves often strike me as quasi-random (because I have no idea what the underlying strategies are.) It sometimes occurs to me that if a very weak chess player were able to masquerade as a grandmaster and play against Kenny Solomon or someone, their aimless moves might be interpreted as an inscrutably deep strategy, and provoke a weakened response...

against most contenders. Humans playing Limaorra often seem to use the so-called “Pavlov” strategy of playing the same number as long as they win, and changing numbers when they lose. In each case, though, a complicated dynamic ensues. As a strategy like Pavlov becomes popular, it is worthwhile for other players to identify who is using it, and thus anticipate them.

This is reminiscent of certain types of queuing problems, or the dynamics in stock trading over long time horizons. When an inefficiency is recognized—aisle three is empty, or wheat is underpriced—it quickly disappears as people respond to it. The upshot of these decisions is an overall pattern that closely resembles randomness—and indeed, randomization strategies are not bad performers, either in Limaorra, the IPD, or the stock market. But they are not usually the *best* strategies, despite the stories told by Fama and Malkiel and other efficient-market theorists. Nor does it make sense that they should be. If a system approximates randomness because people are constantly processing information and using it to anticipate one another, it seems likely that we, too, want to be processing information, lest we fall behind the times. In the limit, there is a sort of paradox; a reversal of the Kantian imperative. If a system behaves randomly because of all the information processing, and then *every agent in the system* decides to treat it as random, then the system is no longer based on information processing

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Recently I ran into an article discussing “bioglyphs” that I can no longer find, discussing their possible use in identifying extra-terrestrial life. Strictly speaking, bioglyphs are an aspect of trace fossils, with the usual example being fossilized burrows (endichnia). Endichnia, and the burrows that create them (above, field mice), often have a signature dendritic structure that can be explained by least-effort algorithms on the part of the animals creating them. Arguably, this pattern can be seen as a signature of living things, occurring at many other scales, from tree roots to capillary beds to things like superhighways, which can be seen from space. This is the more general sense of “bioglyph”.

It's a nice idea, but I'm not sure I'm sold on it. Fossil-hunters often encounter things that appear to be biogenic, and later prove not to be. In at least one crucial example—stromatolites—this is a source of perennial conflict, with different researchers disagreeing on the biogenicity of the same fossils or pseudofossils. So it is not as if bioglyphs are a great labeling system. There also seem to be a number of macro-patterns (rivers,

lightning bolts, shatter patterns) that are morphologically similar to bioglyphs, but are, in our usual understanding, abiogenic—witness, for instance, the whole saga of the “canals” on Mars. Moreover, this whole enterprise has a fuzzy feeling to it. As Goethe said, everything is a leaf, and if our search parameters are vague enough, that is literally true.

What I am more interested in is the idea of, let us call them, *sapioglyphs*: patterns that are signatures of intelligence, not just life. I have two candidates in mind.

The first is along the lines of Hofstadter's “aperiodic crystal”: he was talking about language and radio communication, but we can generalize by thinking of a particular bandwidth of Shannon entropy. Sapiogenic patterns such as text tend to have fairly low but non-zero entropy: in the range of 0.5 to 12 bits per symbol (across known codings). For instance, the first paragraph of this observation has an 4.24 bits per glyph, case-independent. The source code for Sphinx is about 4.4 bits per glyph, which is also near the top of the range for English texts. Some [birdsongs](#) seem to occupy the bottom of this range (0.8 to 3 bits per note). Below this range, we quickly descend into signals that are mind-numbingly predictable. Go too far above these ranges, and we (might) be dealing with superhuman codings, but soon we begin to suspect that the signal is just plain random—shades of Liamorra, there. Since Shannon entropy can be applied to any signal or text, this seems like a useful parameter to look at. If it isn't a litmus test for intelligence, it at least helps pick out interesting patterns: the first few hundred digits of π , *for instance*, are 3.38 bits per digit, which is within the range for written language, although most people would say that π is not a sapiogenic pattern—I can go either way on that.

A more abstract but intuitive approach to sapioglyphs is to look for multivalent cross-referencing. At some point in the not-too-distant future, archaeologists will be looking at fragments of some forgotten computer program or database, and will want to know how smart it was. This is probably the first thing they'll look for: how many *different ways* of cross-referencing the nodes are there? Certainly this is very close to what I mean when I say “X understands Y”: *X can relate Y to other concepts in more than one way, preferably many ways.*

I'm going to guess that these two metrics overlap pretty heavily, but that's a problem for another day.

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When Rebecca Black came out with *Friday* in 2011, there was a sort of pop-culture frenzy to explain why people loved it so much they hated it so much they loved it, but in an ironic way, but no really 167 million views, plus the death threats, oh my god. A major feature in this discourse was the sense that Black was “buying publicity” via ARK Music Factory, a firm devoted to selling fame. While there was nothing at all novel about that sort of transaction, *Friday* managed to touch on some nerve—if you are selling fame, you are selling public attention, which means you are selling the public. The listener is the product, not the music. Somehow, in 2011, that seemed shocking.

We got over it. Today, a common gambit for new musical video releases is to insert them as advertisements in Youtube playlists. If you are using Youtube to stream music—which is a very old-man-in-slippers thing to do, I realize—this causes the occasional head-twitch: *that doesn't sound like Mumford and Sons...* But there is no widespread outrage about this, any more than there was about pay-for-play on old-time radio stations, with antennas and things. As everywhere, the line between advertisement and content—which is the line between the bought and the sold—becomes blurrier.