



Beginning With Networks

Organic networks as descriptions of human organizations.

“We’re all embedded in this network; it affects us profoundly and we may be unaware of its existence, or its effect on us.”

— Nicholas A. Christakis

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Mind

I’ve been puzzling about the old question of why mathematics works so well in physics, originally stated by my mentor Eugene Wigner in a 1960 paper titled, “**The Unreasonable Effectiveness of Mathematics in the Natural Sciences.**” To this, I’ve added a second question, “Why does mathematics fail so badly when applied to the study of mind?”

I must also be clear that psychology is not *the* study of mind, it is *a* study of mind. My question is not limited to psychology, which is a search for the keys of self-understanding under the streetlight of reason.

“Someone saw Nasrudin searching for his keys under the streetlight and went down on their

knees to help him look for them. After a time they asked: 'Where exactly did you drop them?' Nasrudin answered, 'Up the street, but the light is better here.' ”

Until recently, psychology has been hard-nosed in applying reason to understand human behavior. As a result, the field has become somewhat of a vertical marketing scheme—half practical, half philosophical—delivering questionable products to needy customers.

Many of psychology's statements are like orchids: they are pretty, delicate, require constant care, and are best put in pots and admired. The big questions don't fit in the pots, and the keys will not be found under the streetlight.



Semiotics

As I recently pointed out, we are the first animal to reflect on ourselves using sentences and, like people with hammers, we are bashing everything with them. Sentences extend our pre-human object/action relations into the abstract, but sentences built with abstractions cannot provide an understanding of ourselves. Incidentally, the study of the creation of meaning from abstractions is called semiotics, but let's skip the terminology.

A broader study of mind is done inside the mind itself, as an exploration of the limits of knowing. You know you're exploring the boundaries when you start to lose your mind. In this realm, you will experience much that does not fit in sentences.

Those who study the mind are psychonauts, and there are no armchair psychonauts. Some of the best explorers can be the craziest, but to be a good psychonaut you have to be able to get un-crazy, too. It is a good omen that psychological exploration is now, once again, allowed. See Chris Bache's *LSD and the Mind of the Universe: Diamonds from Heaven*.

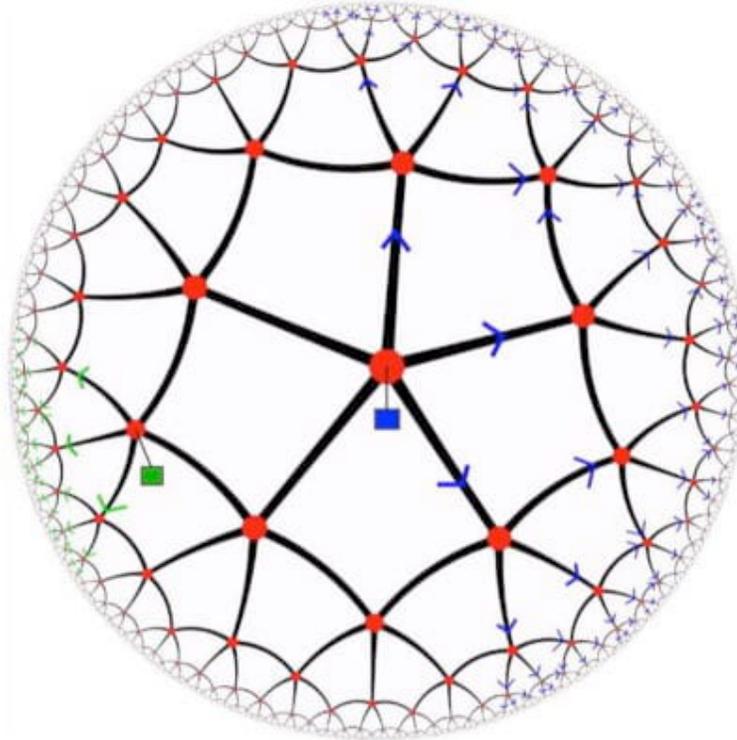
Mathematics

Mathematics depends on the equals sign. There has to be some measure of equality between things or there's no use for it. This works out when things happen on a space that has some kind of smoothness or regularity, after all, you have to be able to get around and have some measure of where you've been. Math is a string of

reasons like the string that Theseus trailed behind him through the labyrinth: if you cut it or drop it, you'll lose your way.

The mind often diverges from reason. In fact, it's in those divergences where novelty develops. Math as we know it doesn't work well in the study of mind because the places in our minds that we want to explore are just those places where math fails: the broken, discontinuous, and unequal places.

Math works so well in physics because physics is the study of those things where math works so well. I don't think math is going to be of much help in the study of mind, so we should get over it. Either that or invent new math. And that brings us back to networks.



Networks

The study of networks has recently become popular for the obvious reason that world commerce now depends on networks. I'm interested in networks for different reasons. I'm interested in them because I suspect they can describe aspects of nature beyond mathematics and sentences.

The infinite structure of which networks are capable sets them outside of language. Their potential lack of continuity, measure, structure, or covering space limits mathematical description. As you can appreciate, most living structures are networks, but what makes them most interesting is their ability to support emergent structures.

Structures

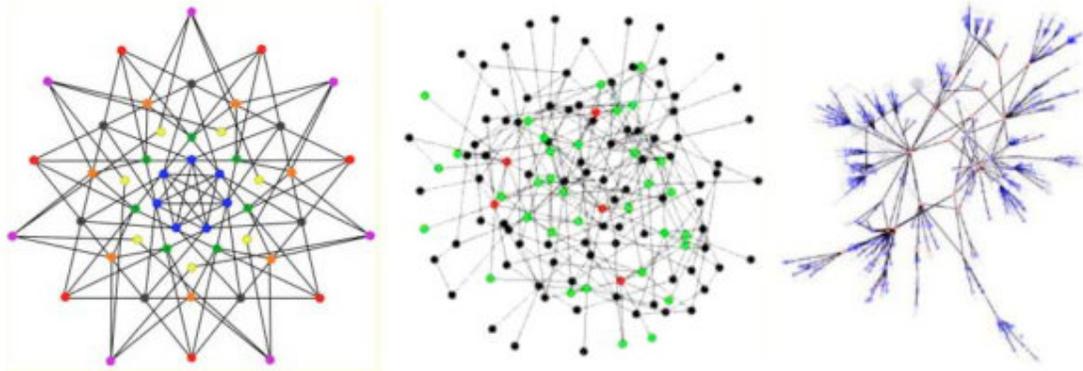
Structures are things that seem to be governed by rules different from those governing their parts. Structural engineering doesn't seem to be governed by the rules of atomic physics, but it is. It's just that you can't use atomic rules to good effect because they're too complicated and indirect. Instead, you extract from them more useful, simpler, large-scale rules.

The large scale rules don't apply to atoms but emerge from them in unpredictable ways. Those living exclusively in the large-scale world only know, or only need to know, these large-scale rules.

Emergent structures emerge from the aggregation of parts. New rules describe these new structures. Biology emerges from physics and stars emerge from molecular clouds, from stardust. Quite a few things, including the mind, are emergent structures and since these are sweeping statements, let's say that the soul does, too.

The question is, "Can emergent structures be better described as networks?" I'll approach a simpler question: "Can the interaction of people be described by networks?" Can we dispense with the rules of reason and look instead to networks of organisms?

Structures of people are a subset of the properties of mind and seem simpler in several respects. Like an atomic pile, we can bring people together and, when the interactions get hot, we can bring them apart. We can understand them as a group and, to a limited extent, we can understand each person separately.



Regular, chaotic, and organic networks.

Incorporations

Let's call a group of people working together "an incorporation," an obvious reference to a corporation but without the formalities. An incorporation is a network of people, processes, time, and resources that operates according to certain regularities and achieves a measure of health.

Its regularities are the interactions of people, the processes they undertake and the resources this involves. Health is that of the people, the sustainability of the processes and the longevity of the group.

All these elements need sustenance. The people need support, the processes need maintenance and the group needs assets. Contain all the people and production within the group and the incorporation starts to look much like an organism; a life form within the larger ecology.

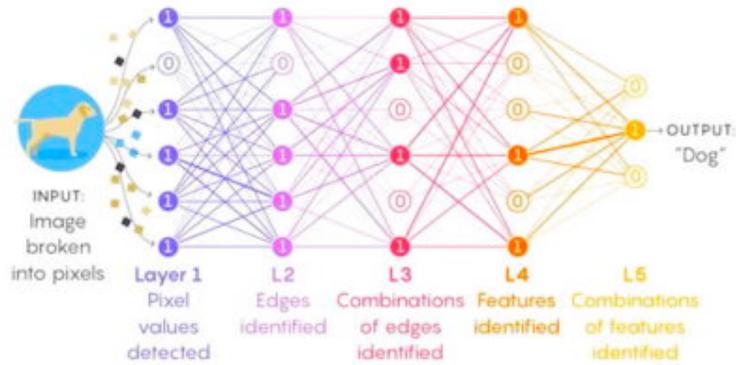
You can view it from the outside, without knowing what goes on inside, looking at the incorporation as a separate thing. You can test it, train it, nurture, or ignore it, and it will display a personality of its own.

A country is a form of incorporation, and countries behave like organisms. They are born, grow, compete, prevail, and survive. They retain their integrity at their boundaries. They move around, ingest each other, evolve, or disappear.

Think of those world maps from grade school that showed the world as a patchwork of colored shapes. The deception of those maps was their lifelessness because you cannot understand a living thing by taking a snapshot of it.

Where did these new group behaviors come from? Does the incorporation have free will? Is it an expression of some internal conspiracy or Great Oz, or is this just a collection of the individual inclinations and the necessities of its parts, like mold on bread? And if an organization does appear to have a personality, might that not just be a preconception we ascribe to it, just as we anthropomorphize animals, plants, cars, and other

inanimate objects?



Decision network for object identification.

Emergence

When you're constrained to follow the protocol you lose your autonomy. We're taught to honor punctuality, order, consistency, and responsibility but you do not set these standards, they are set by the organization.

Question the protocol and you'll invariably be told, "How would you like it if you were treated like that?" Do you see the twisted logic in that question? The Golden Rule applies to people, not organizations. Do you see what's going on?

"We are the Borg. Existence, as you know it, is over. We will add your biological and technological distinctiveness to our own. Resistance is futile."—Star Trek: Voyager. Scorpion Episode.

Incidentally, you should be aware that corporations are considered to be people. In the context of evolving structures, this should scare you. Read, "**'Corporations Are People' Is Built on an Incredible 19th-Century Lie, How a farcical series of events in the 1880s produced an enduring and controversial legal precedent,**" by Adam Winkler in *The Atlantic*.



Mycelia on wood.

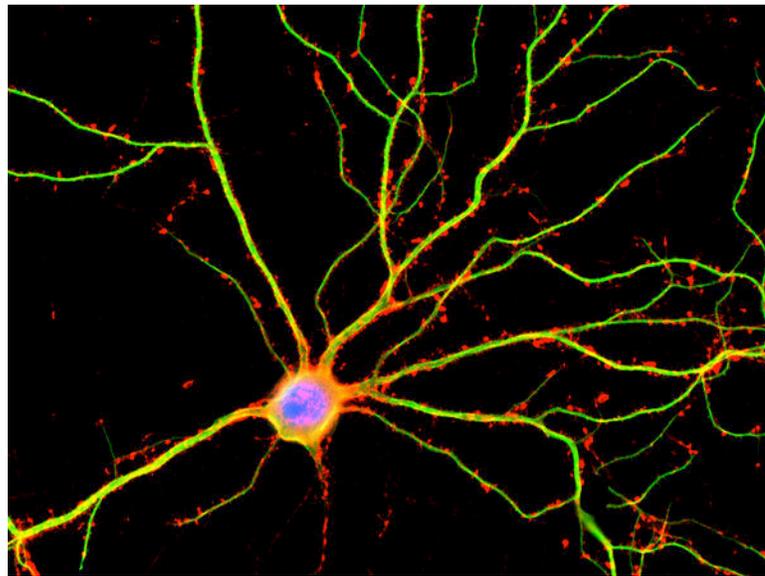
Resonance

In its simplest form, an emergent structure is a resonance of the network. The resonance cannot be sustained

separately within each part, and it can only exist when the parts are constrained to act in concert. The network births a collective behavior that sustains an organizational imperative: resonate or dissipate. When constrained within a repeating structure, a resonator pumps energy and creates a series of standing waves now being called a time crystal.

An organic network can also resonate but in a different way. The world economy pumps oil, gas, and other energies to generate the mycelial-like pattern of light seen from space at night—a nocturnal fungus leaching from the surface of the earth.

Actually, it's the oil, gas, and electric lines that constitute the mycelial network of humanity. The lights seen from space are the reproducing bodies that appear at propitious places to propagate the network. We are the mushrooms glowing in the dark. Blinking like a firefly looking for a mate. Won't we be surprised when one arrives!



Hippocampal neuron.

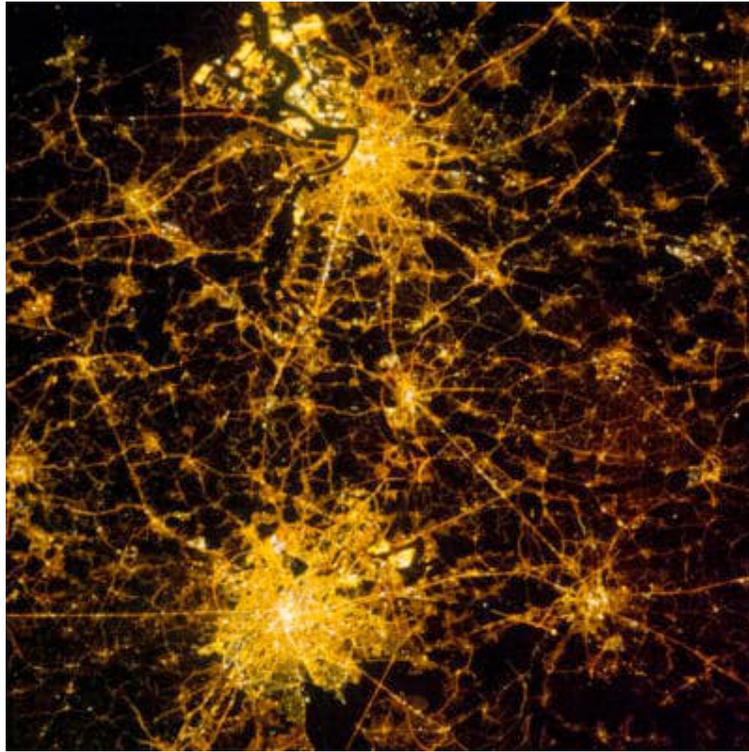
Intelligence

Clearly, there is intelligence somewhere. We ascribe only the most rudimentary intelligence to fungus but, when viewed from outer space, humanity looks fungus-like. Yet individually, each of us contains vast intelligence, far more than we know how or have the opportunity to express.

Where is the intelligence in the incorporation? I like this network talk. I will take it further.

“A single neuron in the brain is an incredibly complex machine that even today we don't understand.”

—Andrew Ng



Brussels and Antwerp from space at night.

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