

Beautiful Networks TDS

NOTES WEEK 3

When we embody extensive properties (physical; quantitative) with intensive properties (sensational; qualitative) the nature of our systems fundamentally changes from being closed and predictable to open and nonlinear. Complexity emerges as mutual interaction and change spur spontaneity and organization.

Examples: A Geographic map is extensive while climate and weather are intensive

The nature of intensive properties is that they change in a nonlinear way (interaction between nodes). They are too complex to simply model in parts and too fluid or dynamic to predict. The interactions affect change in the whole embodied system. Because networks are decentralized they can reorganize themselves easily. The whole does not depend on any single part or node. In clockworks all the parts must remain in a fixed relation to one another or else the mechanism will not function correctly.

Extensive properties are divisible while Intensive properties are indivisible

A volume of water can be divided while its temperature remains indivisible. Intensive properties only change because their whole state changes. By adding heat we are changing the state of the water as a whole and not simply by degree.

For example, a gallon of water can be divided by its volume or extensive property. The temperature of that same volume of water cannot be divided so easily. If the gallon of water is divided into two half gallons and is at a temperature of 100 degrees then we all know the temperature will be the same in both volumes of water. Intensive qualities are indivisible like temperature and only change in *kind* and not degree! The temperature only changes if we change its initial conditions. Intensive properties are by definition more unstable or nonlinear. So if I want to alter an intensive quality I must first understand that it is the whole and not just the parts that do this.

I can say my recent bee sting hurt more than the last time but in reality each sensation, as an intensive property, is an entirely new feeling. Thus pain does not change by degree but changes from one state into another state! Each state is a change in *kind*. Thus each intensive property constantly changes. Intensive properties affect qualitative change in the whole while extensive properties are quantitative and lend themselves more to numerical equivalences or static parts.

When we measure temperature or pain by degree we are superimposing an extensive symbol over an intensive property. We also make the mistake of using extensive spatial concepts when talking about time. For example a clock measures time by way of coordinate points in space. We momentarily stop time by saying that time adheres to static points in space. In reality time is durational and we embody time directly as lived duration. Time is the medium of our lived experience. Our “multiple unity of duration” is complex and nonlinear as the past unrolls into the present but only because the present is

always changing. Thus the past does not repeat itself exactly but is constantly renewed by our ever changing present. As living organisms we experience the contraction and dilation of duration as each state is multiple and the continuity of sensation we experience is fundamentally temporal. Imagine the ever changing present as the driving force behind what makes the future Open to further change. The past is only preserved as an ever changing past. Our experience in time is either contracting or expanding depending on our action in the present moment and the subsequent re-creation of our ever changing past shows us what is different and not the same. In fact our bodies are an expression of this ever changing present since our bodies are literal centers of action! Action and the body coincide.

We can also point out how action or movement is often thought of statically. For instance, an arrow represents the “space crossed” by an action more than presenting the action itself. We are in the habit of making the action and the space that action crosses one and the same thing. In reality no two moments are the same. This means change is an expression of difference in itself. In retrospect we tend to align events similar to one another. In reality each event is unique and different, while the continuity of an ever changing present, allows us to feel those differences as growth or continuous movement. Our feeling of change occurs because of our literal embodiment in the world and less from applying static concepts to either time or movement.

If Being is eternal or unchanging then *Becoming* is how we experience time directly as each state changes completely but through the continuous flow of time. Our bodies then feel this and bring us closer to the “multiple unity of duration.” We all intuitively experience the whole of our becoming! We endure in time as whole creatures.

The challenge we all have is to see complex systems and our own experience as being composed of “wholes connected to wholes” more than parts adding up to the whole or the whole only being analyzed into parts.

1) Living Self-Organization: regeneration of novel parts (e.g. living cells)

2) Nonliving Self-Organization: stable outcomes (e.g. snowflakes)

Again, the pattern of organization is embodied in different physical structures.

The first example is Open to the flow of matter-energy and does not result in a fixed structure (the pattern exists directly *in* time). Changes in the system occur according to matter-energy flowing in and out. Over time chaos or turbulence allow order and complexity to emerge!

The second example is composed of more stable or static components (the pattern is more fixed). Change is produced more by external force and thus follows a more linear and stable trajectory of change.

For example, if I kick a rock the transfer of energy is in a direct cause and effect relationship but if I interact with a living animal the energy is not transferred directly and instead the organism reacts according to its own intensive metabolic system of behavior

Living organisms:

- ✓ **We have art and design because of our bodies!**
- ✓ **We have our senses because our body is a center of action!**
- ✓ **We have thought because our brain is literally embodied in the world!**
- ✓ **All living things learn and communicate in their environment. Many do this without a brain or central nervous system!**
- ✓ **In fact our mobile body encourages all senses to develop and grow continuously in time!**