

Title of talk: Why the 21st century is the century of Systems Thinking

Date of talk: Monday, 8 April 2019

Name and Affiliation of Speaker:

Dr Keekok Lee
Honorary Research Fellow
Faculty of Humanities
University of Manchester

Abstract

This talk examines System Thinking by exploring the following themes:

1. System Thinking is embedded within a philosophical framework which is totally different from that of so-called “standard thinking” found in what may be called the Newtonian sciences, such as classical physics, DNA/ molecular biology, the monogenic conception of disease in Biomedicine, and so on.

SCIENCE

Newtonian

Thing-ontology (macro-sized objects)

Bi-valent logic (Truth or Falsity; 1 or 0)

Humean/linear causality/monofactorial causation

Reductionism/rejection of Wholism

Non- or Not-Newtonian (embodying Systems Thinking)

Process-ontology (relationships between processes & events/patterns of events)

Multi-valent logic (such as fuzzy logic)

Non-linear, multi-factorial causality with feedback loops, reciprocal & synergistic relationships between variables

Rejection of Reductionism/embodiment of Wholism

2. Modern science beginning in the 17th century in Western Europe (which was/is Newtonian) suffered a rupture in its philosophical orientation at least **thrice** in the 20th century: quantum physics from the 1920s onwards, the establishment of ecology as well as the emergence of Epidemiology as proper scientific disciplines in the last century, the former at the end of WWII and the latter in the last quarter of the 20th century. The 21st century may well turn out to be the century of Systems Thinking, of the triumph of non-/not-Newtonian sciences.

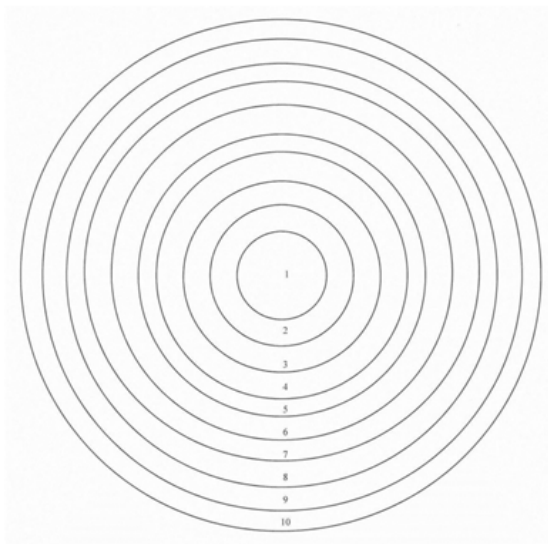
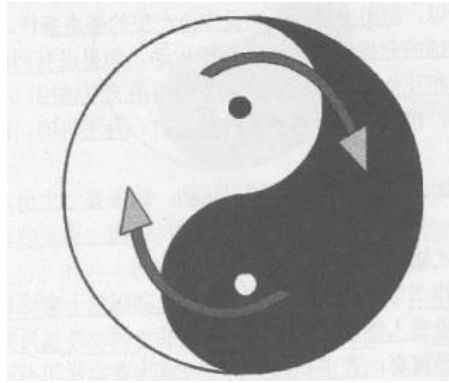
3. The oldest form of Systems Thinking in world history may be found in *The Yijing/I Ching* as well as in Classical Chinese Medicine whose foundation rests on the insights of *The Yijing/I Ching*, the most well-known is the iconic *Yinyang* symbol. These basic insights include: Process-ontology, Wholism, non-linear/multi-factorial causality. In other words, a complex dynamic system.

4. In my opinion, Systems Thinking could more tellingly be re-labelled “Ecosystem Thinking” as any phenomenon under study could best be portrayed as a nesting of ecosystems, the smaller within a larger. The benefit of this new presentation of data will be illustrated by one particular example from Classical Chinese Medicine.

5. Examples of post-Newtonian advances: climate change; meteorology; Ecology; Epidemiology (latest is obesity-related patterns of disease/illness rather than the older pattern of contagious/infectious disease) and other areas of Biomedicine such as:

cancer biology (“the complex interplay between genes, proteins and biological processes that drive the development, growth and spread of cancers”. The Cancer Institute of London)

microbiome/microbiota (“a complex ecological community” including the genes/genomes of microbes (bacteria, viruses and fungi) in our guts (their environment – studied in large-scale metagenomics projects) which play important roles in development of immunity, defence against pathogens, synthesis of vitamins and fat storage as well as influence on human behaviour etc). The human microbiome is considered as an organ in its own right.



Ecosystem-nesting in terms of concentric circles

- 1: Cell
- 2: Tissue
- 3: Organ-system (such as Spleen-stomach 脾胃)
- 4: All organ-systems (wuzang-liufu 五脏六腑)
- 5: Entire material parts & total functioning of the person including emotions (Person Wholism)
- 6: Qi in yuzhou (Macrocosm) as well as meridians (jingluo 经络) operating in the person (Microcosm)
- 7: Immediate external environment in which person lives (air, water, food, shelter, climate...)
- 8: Social/cultural environment in which person lives (tribes/ethnic groups/polity)
- 9: Larger physical/social environment in which person lives (plants/animals/humans/rivers...)
- 10: Cosmological environment in which person lives (Sun/Moon/Earth/Stars/Planets)