

Insight Chapter 3, Section 2 The Canon of Operations

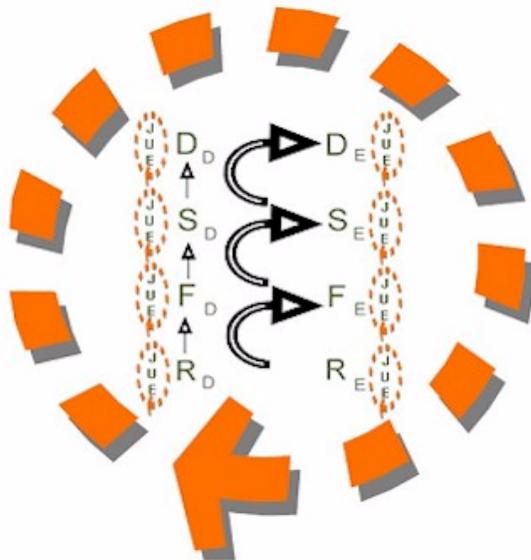
What is the canon?

“Just as inquiry into the data of sense yields insights that are formulated in classical and statistical laws, so inversely, the laws provide premises and rules for the guidance of human activity upon sensible objects. Such activity, in its turn, brings about sensible change to bring to light fresh data, raise new questions, stimulate further insights, and so generate the revision or confirmation of existing laws and in due course the discovery of new laws.”

It is the self-correcting and self-expanding process of learning that generates both horizontal and vertical expansions of one’s horizon.

Generates development in a field and that development includes

1. cumulative expansion
2. construction (technological expansion, innovation, economic growth).
3. analysis of objects
4. cumulative verification
5. test of impartiality and accuracy of observations (quality control)
6. systematization (expands to new laws and seeks their integration with old)
7. higher viewpoints (vertical finality)



Microbiology:

1. Leeuwenhoek’s (1632 – 1723) microscope and the discovery of microbial life.
2. Linnaeus (1707-1778) and his taxonomic system was organizing classes of living things in terms of descriptive features (plants and animals). Leeuwenhoek’s discoveries were placed into these categories, though today fungi, protozoa, algae, prokaryotes and certain small animals (for examples small parasitic worms) are placed into their own categories. (Virus were too small to be seen by the microscope, hence not yet discovered).
3. Questions from late 1800s to early 1900s – Is spontaneous generation of microbial life possible? What causes fermentation? What causes disease? How can we prevent infection and disease?

- a) Notice how the second, third, and fourth are practical questions, however these require a discovery of the immanent intelligibility of microbial life as a first step toward their resolution.
- b) Example: Spontaneous Generation
 - i. Aristotle mentions that this is one source of life
 - ii. Redi (1626 – 1697) meat and maggots experiment
 - iii. Needham (1713 – 1781): boiled beef gravy and infusions of plant material in vials, then notice they grew cloudy – showed microbial life was generated.
 - iv. “Spallanzani (1729 – 1799) repeated, but instead of cork to seal the containers, he melted the vials necks. No life emerged. Why? Did Needham use enough heat? Did microorganism exist in the air? Does spontaneous generation even occur? Did the lack of air not allow the spontaneous generated organism to live?
 - v. Pasteur (1822 – 1895) Created a curved s-neck flask that allowed air but not dust/microbes into the broth. Nothing grew, even after 18 months. Eventually showed that air introduced the microbes. (he tilted some of the flasks allowing them to touch the “dust” in the necks, and the next day these became cloudy.
- 4. The introduction of genetics, biochemistry, and molecular biology has radically expanded this entire field, and sets the stage for a more explanatory classification and interrelation of organisms, including microorganisms.

Insight Chapter 3, Section 3 The Canon of Relevance

States the understanding proper to the empirical scientist. That understanding is the intelligibility immanent in the data, and intelligibility that explains intrinsic meaning of the data.

Data can lead to various places

- 1. To final, material, instrumental, and efficient causality
- 2. or to the immanent intelligibility of a thing, which regards not relations to one’s senses, but rather the relations of things to each other.
 - a) Physics: relations of energies to each other
 - b) Chemistry: relations of elements in the periodic table and compounds through equations (and various charts).
 - c) Biology: relations of living forms to one another
- 4. This intelligibility is hypothetical. It is not a “necessity” as in math, but rather a possibility (because the data or not continuous).
- 5. The intelligibility can be verified through relating the possible hypothetical intelligibilities to the empirical data and thus discern a realized possibility.
- 6. Lonergan argues that this intelligibility is what ultimate was sought as formal causality in Aristotelian science (or at least a species of formal causality).