

Chapter 2: Heuristic Structures of Empirical Method  
Sections 1 – 2.3  
Shifting to intelligence as dynamic

1. heuristic: guide/directives/principles for finding solutions.
2. Heuristic notion: a single directive, principle for finding solutions.
3. Heuristic structures: an ordered set of directives/principles for finding solutions.

Relevance in book:

1. Understanding heuristic structures, the different kinds, and their relationship to each other, is needed to understand the dynamically developing nature of human intelligence as a whole.
2. Provides an “image” upon which one can reflect upon later in the book for developing a metaphysics of development in general: and more specifically, once integrated with higher viewpoints, and a few as yet undiscussed notions and heuristics structures, a general understanding of the unfolding of the universe from the lowest forms of energy to human history.
3. Contributes to reestablishing the science of metaphysics.

What Lonergan does

1. Shifts from Math to Science because of the obvious developmental growth of the sciences over the last number of centuries. Hence it provides an obvious and relevant example of the development of intelligence. Plus, sciences like physics and chemistry have more clearly entered into explanatory modes of definition.
  - a. Also, it is best to start with some of the simpler sciences, namely physics and chemistry (where the things studied do not develop intrinsic—as do trees from acorns and humans from zygotes)
    - i. By “simpler”, I mean only when one moves into the explanatory mode. Hence just as arithmetic is “simpler” in general than algebra, algebra than calculus; so physics is simpler than chemistry (when chemistry moves into a more complete explanatory mode of definition), and chemistry than biology (when biology moves into a more explanatory mode of definition), etc..
2. Comparing Math and Science
  - a. Similarities
    - i. Immanent intelligibility = direct insight = understanding the basic terms and relations that make something be what it is.
      1. both filter out many aspect of the data deemed irrelevant to discovering the immanent intelligibility.
    - ii. Clues
      1. equality of spokes
      2. correlation of measurements in a fall
    - iii. Non-imaginable
  - b. Dissimilarities

- i. No need and need for field work
  - ii. Continuous and discontinuous data
  - iii. Necessity/impossibility vs possibility
  - iv. Imagination does best to keep up vs data do not
  - v. Immanent/internal circuit vs external circuit
    - 1. Math: initial images→insights→definitions/postulates→symbolic operations→more general images→higher viewpoints
    - 2. Science: data and images→insights→hypothesis→deductions and calculations (like symbolic operations)→observation and experimentation→uncovers initially overlooked or neglected data→revisions of viewpoints
3. Classical Heuristic Structures
- a. Clue leads one to a sense of a problem to be solved.
  - b. How to then solve the problem
    - i. Analogy of math:
      - 1. naming the unknown: X
      - 2. identify the known properties and relations connected to the unknown
      - 3. grasping (understanding) how to combine these properties and relations to form an equation
      - 4. solve
    - ii. In Science
      - 1. Stage 1 (Aristotle): Nature of...
        - a. From the data of sense of things in relation to us, descriptive insights emerge. This provides the basis for then asking the further question: What is the nature of X?
        - b. Eg. identifying and naming the experience of something hot or cold (relative to the sense of touch) allows us to ask what is the nature of heat?
      - 2. Stage 2 (Galileo): the Unspecified correlation to be specified, the indeterminate function to be determined.
        - a. From the question about the nature of something, one can then return to the data and begin to examine the data in terms of the relationships of things to each other. (found apart, together, increase decrease concomitantly, similar antecedents or consequents, similar in proportions—eg. elements in periodic table)
        - b. Eg. Pre-explanatory classifications systems in biology (Kingdom, phylum, class, order, family, genus, species, etc..) give way to more precise correlations of organism in evolutionary trees (notice how this shifts as one incorporates genetic/molecular/biochemical intelligibilities)