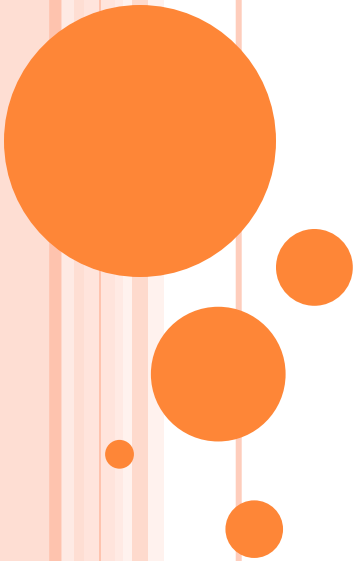
Mill's Methods of Experimental Enquiry



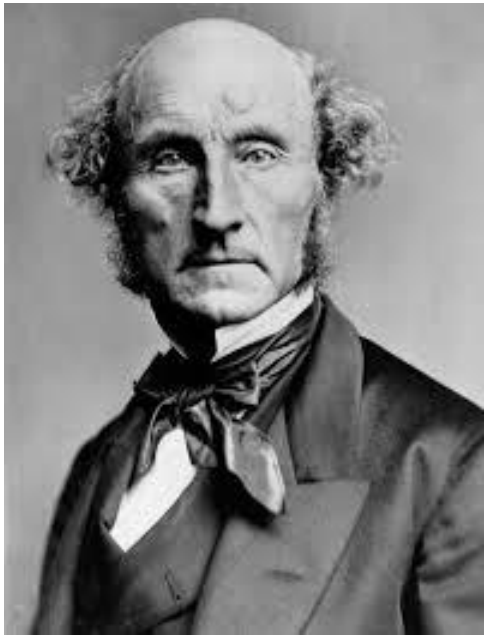
The Syllabus

PHIA- SEMESTER 4- CC 8 (Western Logic – 1)

f) Mill's Method of Experimental Inquiry; Mill's Method of Agreement, Method of Difference, Joint Method of Agreement and Difference, Method of Residues, Method of Concomitant Variations; Criticism of Mill's Methods, Vindication of Mill's Methods.

A BRIEF SKETCH ON J. S. MILL

- **John Stuart Mill** (1806 – 1873), usually cited as J. S. Mill, was a British philosopher



- His areas of interest were political philosophy, ethics, economics and inductive logic

- In his book ***A System of Logic*** **(1843)** he presented his views on inductive reasoning from known to the unknown

- He formulated five methods of induction where laws were discovered through observation and induction, and required empirical verification

- These methods were intended to illuminate issues of causation

Mill's Methods

- Method of Agreement
- Method of Difference
- Joint Method of Agreement and Difference
- Method of Residues
- Method of Concomitant Variations

Method of Agreement

- **Definition**:

  If two or more instances of the phenomenon under investigation have only one circumstance in common, the circumstance in which alone all the instances agree, is the cause (or effect) of the given phenomenon

- **Symbolic representation**:

  A B C D occur together with **w** x y z

  A E F G occur together with **w** t u v

  Therefore, **A** is the cause (or the effect) of **w**

- Whenever we find a single circumstance common to all instances of a given phenomenon, we may believe ourselves to have discovered its cause

CONTD…

- **Concrete example**:

  To find out the cause of illness of some residents of a certain dormitory suffering from stomach distress and nausea it is observed that

  Student 1 ate soup, bread, butter, salad and canned coke

  Student 2 ate soup, chicken sandwich, vegetables and canned coke

  Student 3 ate bread, butter, omelette and canned coke

  Student 4 ate soup, chicken sandwich, salad and canned coke

  Student 5 ate soup, salad, fruits and canned coke

  Student 6 ate bread, butter, omelette, fruits and canned coke

Therefore, it can be said that the illness is probably due to eating canned coke served in the dormitory

CONTD…

- **Limitation**:

a) Fallacy of non-observation may occur.

b) Fallacy of illicit generalization may occur.

c) In the Method of Agreement, however many instances we examine that are alike, the very next one may be unlike, that is, not accompanied by the phenomenon in question.

Method of Difference

- **Definition**:

  If an instance in which the phenomenon under investigation occurs and an instance in which it does not occur, have every circumstance in common save one, that one occurring only in the former, the circumstance in which alone the two instances differ, is the effect, or the cause, or an indispensable part of the cause, of the phenomenon

- **Symbolic Representation**:

  A B C D occur together with w x y z

  B C D occur together with x y z

  Therefore, **A** is the cause, or the effect, or an indispensable part of the cause, of **w**

CONTD…

- **Concrete example**:

  If on further investigation, in the dormitory we found a student who, on the day that many had become ill, had eaten soup, bread, butter, salad and vegetables only and had not become ill, we could reasonably conclude that eating canned coke is the cause of their illness

  All students in the dormitory (except John) ate canned coke and became ill

  John did not eat canned coke and had not become ill

  Therefore, the illness of the students of the dormitory was due to eating canned coke

CONTD…

- **Limitation**:

a) The greater the number of instances examined, the lower the probability of finding a later exception, but as long as there remain any unobserved instances, there remains the possibility that the inductive conclusion will someday be shown false

b) The fallacy of post hoc ergo propter hoc may occur

Joint Method of Agreement and Difference

- **Definition:**

1. The Joint Method of Agreement and Difference can be explained simply as the use of both the Method of Agreement and the Method of Difference in the same investigation

2. If two or more instances in which the phenomenon under investigation occurs have only one circumstance in common, while two or more instances in which it does not occur have nothing in common save the absence of that circumstance; the circumstance in which alone the two sets of instances differ, is the effect, or the cause, or an indispensable part of the cause, of the given phenomenon

CONTD…

- **Symbolic Representation**:

A B C --------- x y z
A D E --------- x t w

A B C ---------- x y z
B C ---------- y z

Therefore, **A** is the effect, or the cause, or an indispensable part of the cause, of **x**

- **Concrete Example**:

In order to invent the vaccine of Hepatitis A, an experiment was done among1037 children of New York. Half of them (519) received a single dose of the new vaccine and none of them was reported to have Hepatitis A. Of the 518 children who received dummy injections, 25 soon became infected with Hepatitis A. Thus the vaccine of Hepatitis A was found.

CONTD…

- **Limitation**:

The Joint Method of Agreement and Difference seem to have the limitations of the Method of Agreement and the Method of Difference

Method of Residues

- **Definition**:

  Subduct from any phenomenon such part as is known by previous inductions to be the effect of certain antecedents, and the residue of the phenomenon is the effect of the remaining antecedents

- **Symbolic Representation**:

  A B C -------- x y z

  B is known to be the cause of y

  C is known to be the cause of z

  Therefore, **A** is the cause of **x**.

CONTD…

- **Concrete Example**:

  In order to know the weight of cargo of a truck, the truck is weighed when empty and then weighed again when it has been loaded. The residue is the weight of the cargo.

- **Limitation**:

  This method is sometimes said to be a strictly deductive pattern of inference and nit inductive at all

Method of Concomitant Variation

- **Definition**:

  Whatever phenomenon varies in any manner whenever another phenomenon varies in some particular manner is either a cause or an effect of that phenomenon or is connected with it through some fact of causation

- **Symbolic Representation**:

A B C ---------- x y z	A B C ---------- x y z
A+ B C ---------- x+ y z	A+ B C ---------- x - y z
A - B C ---------- x - y z	A - B C ---------- x + y z

Therefore, **A** and **x** are causally connected

CONTD…

- **Concrete Example**:

  If the demand for a given type of goods remains constant, then any increase in the supply of those goods will be accompanied by a decrease in the price commanded by them, and vice versa. This concomitant variation is certainly part of the evidence for a causal connection between the supply and the price of a given commodity

- **Limitation**:

  The way in which observed correlations can mislead us about causation is shown most plainly when the Method of Concomitant Variation is applied with ingenuity. The ups and downs of the stock market, for example, can be “shown” to correlate closely with the ups and downs of clothing fashions

Criticism of Mill's Methods

- The methods are not sufficient to account for the *discovery* of causal laws. The reason is that it is essential that the relevant factors and circumstances in any investigation be identified in order for the methods to be applied. In any scientific investigation, it is impossible to examine all circumstances; if we do not examine the relevant ones, the methods can not yield correct scientific laws

- The Methods can not provide rules for the *proof* of scientific laws because, since the methods must rely on a preceding analysis of the circumstances, and that analysis may be mistaken, the use of the methods based on that analysis may also be mistaken

Conclusive Comment

In spite of the deficiencies of Mill's Methods, it can be concluded by saying that

- These methods are profoundly important as the **chief means of testing scientific hypotheses**
- And taken together, these inductive techniques constitute **the method of controlled experiment**, which is an essential tool in all of science

SOURCE:

- Irving M. Copi and Carl Cohen, *Introduction to Logic* (9th edition), Prentice Hall of India Pvt Ltd, New Delhi, 1995

Thank You

Any query regarding the topic
Is always welcome