

# PY 5205 Origins and History of Analytic Philosophy

**Class teacher: Dr Peter Clark**

## Course Guide

The central theme of the first component of the Origins is to understand the rise of conventionalism as a response to the failure of Kant's philosophy to provide a conceptual framework in which the developments in science and mathematics in the second half of the Nineteenth Century could be understood.

The course begins with an introduction to the work of Ernst Mach and Pierre Duhem, who together with William Whewell in England, essentially founded the discipline of the history and philosophy of science, in its modern form. It was with Mach and Duhem that the history of science first impacted in a major way on epistemology and in particular upon the supposition very widely held upon the Continent that the natural sciences and mathematics presupposed a Kantian framework of forms of spatial and temporal intuition known *a priori*. As an example of that view we need only to consider the introduction to Helmholtz's classic paper on 'The Law of the Conservation of Energy' (1847). Mach was the inventor and master of the method of the 'critical-historical' case study which he yielded to such effect in the *History and Root of the Law of the Conservation of Energy* (1872) and more broadly in the *Science of Mechanics* (1883). This latter great work, with its emphasis upon separating the facts of experience from that which is brought to the facts, was crucial in the development of relativity theory by Poincaré and Einstein. It was these studies of the evolution of scientific theories and of their conceptual foundations which lead Mach to the central epistemological claims of his major works the *Analysis of Sensations* (1886/1906), *Knowledge and Error* (1905) and *Space and Geometry* (1906).

For Duhem too it was his work on the Astronomical Revolution (see particularly his *To save The Phenomena* (1908)) and its precursors which provided the impetus for his great treatise on conventionalism in physics *The Aim and Structure of Physical Theory* (1906/1913).

The second section of this module will examine the development and impact of modern logic with a look at the great achievements in logic of Frege (particularly in the *Begriffsschrift*,

1879), Richard Dedekind and Bertrand Russell. Here too all were responding to the core Kantian thesis that spatial (and temporal) intuition could be deployed as a foundation for logic and arithmetic. Again these authors were responding to the historical development of real analysis and geometry, for it had become apparent that in the case of analysis that spatial intuition was simply no part of the foundations or content of analysis. Intuition was plainly inadequate to its task in analysis and David Hilbert had established in *The Foundations of Geometry* (1899) that geometry itself needed for its deductive elaboration general assertions whose truth could not be founded on intuition (e.g. the continuity axiom for Euclidean geometry). However logic was inadequate to the task, for it presupposed rather than was presupposed by, finitary elementary arithmetic (the thesis of the priority of finitary methods over logic). David Hilbert certainly accepted that there was a crisis in mathematics and his solution was quite extraordinary. It was in effect the mathematisation of certain philosophical constraints and ideas: that was the beginning of the real Hilbert programme.

The third part of the course is devoted to what can be no more than a glance at Poincaré's conventionalism. For Poincaré there never was a crisis in mathematics, the crisis was merely confined to logic, which was anyway inadequate for mathematics. Nevertheless so was pure Kantian spatial intuition, it too could not found analysis. What was then to provide the correct understanding of mathematics and the empirical sciences?

### **Reading List**

General reading:

J. Alberto Coffa: *The Semantic Tradition from Kant to Carnap: To the Vienna Station*

#### **Part 1:**

H. von Helmholtz: The Principle of the Conservation of Energy, in S.G. Brush *The Kind of Motion We Call Heat*, Volume One.

M Friedman: *Kant and the Exact Sciences*, 1992, Harvard University Press

E. Mach: *The History and Root of the Principle of the Conservation of Energy*, (1872),

E. Mach: *The Science of Mechanics*, (1883),

E. Mach: *Knowledge and Error: Sketches on the Psychology of Enquiry* (1905)

E. Mach : *The Analysis of Sensations* (1886)

E.Mach: *Popular Scientific Lectures* (1895)

E.G. Zahar: 'Second thoughts about Machian Positivism', *British Journal for the Philosophy of Science*, **32**, 1981, pp.267-276.

J. B. Barbour *Absolute or Relative Motion?* Volume One ,pp.676-90.

Pierre Duhem: *The Aim and Structure of Physical Theory* (1906)

## Part II

G. Frege : *Begriffsschrift , eine der arithmetischen nachgebildete Formelsprache des reinen Denkens* , 1879 , reprinted and translated in van Heijenoort, *From Frege to Godel, A Source Book in Mathematical Logic,1879-1931*, pp.1-82.

G.Frege: *Die Grundlagen der Arithmetik.Eine logisch mathematische Untersuchung uber den Begriff der Zahl*, 1884. Translated by J L Austin as 'The Foundations of Arithmetic' Oxford UP 1950.

R. Dedekind: 'Letter to Keferstein', in van Heijenoort , *From Frege to Godel, A Source Book in Mathematical Logic,1879-1931*,pp.98-103.

B. Russell: 'Letter to Frege' in van Heijenoort , *From Frege to Godel, A Source Book in Mathematical Logic,1879-1931*,pp.124-5

G. Frege: 'Letter to Russell', in van Heijenoort , *From Frege to Godel, A Source Book in Mathematical Logic,1879-1931*,pp. 126-128.

George Boolos: 'Gottlob Frege and the Foundations of Arithmetic' *Logic, Logic and Logic*, pp143-154.

George Boolos : 'Reading the Begriffsschrift', *Logic, Logic and Logic*, pp.155-170.

Peter Hylton: *Russell,Idealism and The Emergence of Analytical Philosophy*. Chapter Five and Chapter Seven

## Part III

Henri Poincaré: *Science and Hypothesis* (1902)

Henri Poincaré: *The Value of Science* (1905)

Henri Poincaré: *Mathematics and Science : Last essays* (1913)

Janet Folina: *Poincaré and the philosophy of Mathematics* , Macmillan Studies in Contemporary Philosophy,1992

Warren Goldfarb 'Poincaré against the Logicians', in Asprey and Kitcher (eds): *History and Philosophy of Modern Mathematics*, pp.61-81

Stathis Psillos: *Scientific Realism : How Science Tracks Truth*, Routledge 1999

John Worrall: 'Structural realism :The Best of Both Worlds?', *Dialectica*,**43**,1989, pp.99-124.

Rudolph Carnap: *Philosophy and Logical Syntax*, (University College London Lectures,Oct 1934) Thoemmes Press,1936

## Lecture Guide

Week One : General Introduction

Week Two: Mach and Conventionalism

Week Three: Mach and the Problem of Motion

Week four Pierre Duhem

Week five: Main themes of the *Begriffsschrift*

Week Six: Logic and Logicism

Week Seven: The Contradiction and Russell's Response

Week Eight : Logic and The Syntax of Language: Carnap and the Legacy of Frege.

Week Nine : Poincaré and structural realism

Week Ten: Poincaré and The Return of the Synthetic A Priori

Week Eleven: Hilbert and the Mathematisation of foundational Issues.

Week twelve: The Rise of Semantics

## Essay Topics

Max word length 4,000

You may write on one of the topics below or provide your own topic which should be approved by me in the first instance .

- (a) Mach argued that the aim of science is the economy of thought. What does this view amount to? Is it defensible?
- (b) Was Duhem right to argue that there are no crucial experiments in physics?
- (c) What was Frege's achievement in the *Begriffsschrift*? Can it be used to provide a decisive refutation of Kant?
- (d) What did Frege mean by an 'ideal justification'? Is there anything in the notion?
- (e) What is the thesis of the priority of arithmetic over logic?  
Is it true?
- (f) Was Poincaré right to believe that our knowledge of the continuum is knowledge synthetic a priori?
- (g) What are the major problems facing the thesis of scientific realism?  
Does structural realism provide an answer to them?
- (h) What is Kant's account of the foundations of the exact sciences? Is his view still defensible?

