

Stefano Gattei

WHAT IS THIS THING CALLED SCIENCE? **Critical thinking and the growth of knowledge**

4 seminars, 5 hours

1. The second Scientific Revolution and the philosophical reaction to it.

The twentieth century opened with a profound crisis of the so-called “hard” sciences, followed by a radical change of our understanding the world: the theory of relativity, quantum physics, the debate over the foundations of mathematics and Gödel’s theorems shook the very idea of science that was adopted ever since Newton’s *Principia*. On their side, philosophers attempted to cope with such transformation by offering new insights on the very nature of the scientific enterprise. They offered a recombination of rationalism and empiricism so as to paint a new picture of science – one that might be able, on the one hand, to take into account the most recent developments, and, on the other, to avoid repeating the errors that led to the crisis.

BIBLIOGRAPHY

Donald Gillies, *Philosophy of Science in the Twentieth Century: Four Central Themes*, Oxford: Blackwell, 1993 (chs. 1, 4-8); David Oldroyd, *The Arch of Knowledge: An Introductory Study of the History of the Philosophy and Methodology of Science*, New York-London: Methuen, 1986 (chs. 6-7).

2. Karl Popper’s falsificationism: rationality without foundations.

In the same years, through a tightly-knit dialogue with some members of the Vienna Circle, Karl Popper called attention to the role of criticism in the growth of scientific knowledge. Science does not progress because it has very solid foundations, he argued – rather, because it is able, unlike other forms of knowledge, to continuously evolve by correcting and learning from its errors. What characterizes science is not the possession of knowledge, or truth, but a persistent and recklessly quest for truth.

BIBLIOGRAPHY

Stefano Gattei, *Karl Popper: Rationality Without Foundations*, London: Routledge, 2009; Karl R. Popper, *The Logic of Scientific Discovery*, London: Hutchinson, 1959; Id., *Conjectures and Refutations: The Growth of Scientific Knowledge*, London: Routledge, 1963.

3. The fruitful interaction of history and philosophy of science: Thomas Kuhn.

The second half of the twentieth century is marked by a new generations of philosophers of science that challenge the *received view* by appealing to the

history of science: Michael Polanyi, Norwood Russell Hanson, Stephen Toulmin, Thomas Kuhn. Among them, Kuhn stands out by advancing a model for the growth of scientific knowledge and introducing a few terms and concepts (paradigm, normal science, revolution, incommensurability) around which would turn the debate in the following decades. Kuhn's challenge at Popper's rationalism reshaped our understanding of the nature of scientific arguments.

BIBLIOGRAPHY

Stefano Gattei, *Thomas S. Kuhn's 'Linguistic Turn' and the Legacy of Logical Empiricism*, London: Routledge, 2008; Thomas S. Kuhn, *The Structure of Scientific Revolutions*, Chicago-London: The University of Chicago Press, 1962.

4. The arguments of science.

Every day we are with all sorts of arguments, and it is crucial to distinguish between valid and invalid arguments, convincing and unconvincing arguments, arguments with a real content and arguments that are devoid of any content. We shall see and discuss different kinds of arguments (proofs, proper arguments, fallacies, para-arguments), and see what characterizes scientific reasoning.

BIBLIOGRAPHY

Alec Fisher, *Critical Thinking: An Introduction*, Cambridge: Cambridge University Press, 2011²; Charles L. Hamblin, *Fallacies*, London: Methuen, 1970.

Schedule

October 26, 2022: 14:00-15:00 (online)

October 28, 2022: 14:00-15:00 (online)

October 31, 2022: 17:00-18:00 EGO-VIRGO, Cascina (PI)

November 2, 2022: 10:00-12:00 EGO-VIRGO, Cascina (PI)