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The self-criticism of science

The contemporary philosophy of science &
the problem of the scientific consciousness

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The self-criticism of science - the contemporary philosophy of science and the problem of the scientific consciousness

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Alexis Karpouzos is a writer. In the last 15 years, he has created *Think.Lab*, an open space-time of thought and action that aspires to create a different experience in education and culture. In the self-organised *Think.Lab*, a number of workshops are running. Workshops of apprenticeship and reflection in which the members are educated in various cognitive objects, such as philosophy, theoretical linguistics, theory of literature, social and political sciences, theoretical physics, logic and mathematics, formative and visual arts.

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Contents

Scientism	1
Physiocracy of phenomenocracy	5
Empiricism	8
Objectivity of value indifference	10
Instrumentalist knowledge	12
The epistemologically problems of the contemporary scientific knowledge	14
Beyond the metaphysics antithesis of technic and art.	19

The contemporary philosophy of science (epistemology) featuring K.Popper, T.Kuhn, I.Lakatos, P.Feyerabend, Hanson among others, has exercised a decisive critique to the dominant views of the positivist and neo-positivist model of knowledge and has in fact undermined its credibility. The most important attacks on positivism are focusing on its fundamental tenets presented below:

Scientism

Scientism, or the unity of scientific method. The positivist methodology does not see any difference between the natural and the social sciences. The adoption however, of the unity of the scientific method is accepted in tandem with the notion of the predominant role of the natural sciences, in which the social sciences see their model. The outcome is what we call scientism, that is the view that only the natural sciences can produce the semantic interpretation of knowledge.

In the following commentary we will schematically present the criticisms that have been addressed to the positivist and naturalistic knowledge paradigm. All the thinkers and all the currents of social theory that are opposed to positivism, converge to the following point: The method of natural sciences cannot be transported to the social sciences; and this because the object of study of social sciences is a pre-interpreted world of events, that is a social world in which the categories of experience have already been formulated by and through the context of noematic-semantic behavior of the human subjects and the communicative exchanges and interactions that are

taking place. The social scientist is not a mere observer of natural events but participates as an active social subject in the symbolic-semantic systems that she/he examines. The necessary implication is that she cannot study the social events 'from the outside', as if the latter were mere 'objects'. The purpose of her study is to interpret and understand the justifications, the expectations and the multitude of ways through which human subjects go by in their social interactions and also how this experience affects them.

The social scientist can understand human subjects because he is part of the social world and is also the 'subject' of his study. In this way, his hermeneutic endeavor cannot attain an ideological or evaluative neutrality.

The aim of the social scientist is not to search for laws that govern human behavior or the social world, but the understanding of its significance and the discovery of the social and psychological preconditions that contributed to the character of the former.

Historical and social phenomena are unique and unrepeatable, are related to values and aims, while natural phenomena are connected with relations of causation. As a consequence, the social scientist cannot articulate laws and proceed to projections. The intention of positivist sociology to discover social 'laws' turns sociology into social technology.

Relevant to the issue at hand, the phenomenological hermeneutics of Hans Georg Gadamer and Martin Heidegger, introduced the notion of understanding as the ontological precondition of the human society. Under-

standing predates the cognitive process of the subject and it is in this sense that the distinction between natural and social sciences disappears. Understanding forms the archetypical existential condition of being and is connected to the potentiality of being, as a temporality, which is the structural element of human existence. From this point of view, the meaning of the phrase 'the Being-in-itself is time' is that the nature of human existence lies in its historicity and temporality is literally 'in the world'. The historicity of the life-world is the a priori condition that makes knowledge and self-conscience possible. Through the hermeneutic process, understanding emerges as the specific manner in which the historicity of nature takes its form.

The ideal of objective knowledge, of impartiality and precision as targets of the modernistic thought and their connection to the method of the natural sciences, is rejected and refuted. Any cognitive operation is par excellence a hermeneutic activity. The interpreter is pre-dispossessed inside the historic life-world that substantiated his existence. And even if we try to forge the natural vs the social sciences distinction as a division of methods and tools, the hermeneutic experience cannot be separated from the methodological scrutiny. As a result of all this, the ideal of an a-historic, objective and universal truth is being seriously challenged, while the historical nature of knowledge and interpretation come to the fore. The phenomenological hermeneutics of Heidegger and Gadamer lies in parallel to the newer developments in the philosophy of science. Roy Bashkar, 'things exist and act independently of our descriptions, but we are capable to know them only through the specific descriptions. De-

scriptions exist in the world of human society, objects in the world of nature. We express our own understanding of nature and thought.

Physiocracy of phenomenocracy

For positivism, the object of scientific method is an external reality and science is signified from the observable natural phenomena. This view entails on one hand physiocracy, that is the recognition of the physio-empirical origin of knowledge and on the other hand physiocracy or objectivism, that is, the acceptance of an objective and self-sustainable existence of phenomena.

The answer to the previous arguments is constructed by the position known as underdetermination of theory from empirical indications and the theoretical weighting of the action of observation. Both these critical challenges to positivism were born out of the context of conventionalism, which historically has set the first main point of opposition to positivism (or rather, to reductionism). The basic epistemological tenet of conventionalism holds that the laws of science (such as Newtonian mechanics) and the axioms of mathematics (like Euclidian geometry) are not experimental generalizations, neither a priori knowledge but conventions or linguistic definitions. The French philosopher of science, Henri Poincare, is considered the main proponent of conventionalism.

The position of under-determination rejects the possibility of a solely empirical determination of theory, i.e. the possibility for a theoretical schema that lies in absolute agreement with experience. The justification of the underdetermination thesis is founded on some arguments developed by Duhem and Quine and due to this it is also known as the Duhem-Quine thesis (despite that the independent views of Duhem and Quine do not always coincide).

We now come to the thesis of theory-ladenness of observation, which also initially was put forward by Duhem. Duhem has distinctively stated the central point of this thesis in the title of a chapter of his book as 'An Experiment in Physics is not simply the observation of a phenomenon; it is besides, the theoretical interpretation of this phenomenon.' Later on, the thesis was adopted and developed by Kuhn, Feyerabend, Bohm, Hanson, Toulmin.

The theory-ladenness of observation, is usually understood as a two-fold concept:

- a) That observations include an accompanying set of hypotheses, which appear in the form of theory of measurement, psychology of observation, linguistic orderings etc.
- b) In the sense that what is regarded as a relative and precise empirical indication is based partly on the theoretical paradigm to which the empirical indication itself comes to examine.

The first concept corresponds to the thesis of underdetermination of theory. A consequence of the theory-ladenness of observation is that scientists can in principle be suspicious of a certain observation and challenge the validity of its constituent hypotheses. The second concept of the theory-ladenness of observation has some interesting consequences on the role of observation in the choice of theory. It is an obvious fact, according to this concept, that observations cannot function as objective referees in the choice of theory, when at the same time, the importance and the character of the former, and their own estimating and measuring ability is dependent upon

competitive theories. It is precisely in this way that theory-laden observations can lead to opposing conclusions (in the sense of Kuhn). In addition to that, even if the supporters of different theories agree to the importance of a crucial experiment, the evident assumption would be that the different theoretical priorities of scientists would differentiate the nature of their own estimation and also the mediums used to reach this estimation. We therefore see that the thesis of the theory-ladenness of observations creates the preconditions for the existence of different scientific priorities. And it is within the intentions of social studies of science, the sociological analysis of these differences in the framework of certain scientific practices.

Empiricism

On the basis of positivist epistemology lays the empirical observation (verification criteria), which takes shape with the experimental method. The self-obvious recognition of the positive character of experience as the exclusive criterion of truth is the characteristic feature of positivism, throughout all the forms of Greek and Western philosophical tradition. Karl Popper, in the 1930's, went against the positivist ratification and rejected the inductive method. To find a way out of the dead-end of inductivism, Popper presented an alternative method of inference, which replaces the principle of verification with the principle of falsification. The epistemological method of Popper, based on conjectures and formulations, is also known as falsificationism, or method of trial-and-error. In this method, science does not start from observations in order to proceed through the way of inductive inferences, according to the inductivist position. By contrast to the positivist view, it starts from certain conjectural hypotheses, which are being put to the test of empirical testing and scientists try to reformulate them, keeping a critical stance in the process and experimenting with alternative hypotheses. So, in place of the inductive method, Popper proposes the deductive reasoning (from the general to the specific) through the process of falsification (refutation) of a hypothesis (or a conjecture).

A scientific theory which survives after a substantial amount of critical examinations and empirical tests can be accepted on a temporary basis and not permanently, until the time comes of some future test that will overthrow it. In other words, for Popper no theory is verifiable, it may only have a high degree of empirical

strength, which implies that all scientific theories are in principle falsifiable. Added to that, there are many theories that continue to be accepted despite the fact that their validity has already been seriously challenged. Newtonian mechanics was an example of such theories. Newton's theory had an extraordinary agreement with observation and experiment at the time of its appearance (1687) until 1900. But in the first twenty years of the 20th century, its validity was challenged from the new viewpoint of relativist mechanics, without however been abandoned. A similar situation exists for the Euclidean geometry which is considered to be valid for the Earth but no so in the Universe.

Objectivity of value indifference

Science as viewed by positivism, should not engage in any value judgments of its object of study. It is an objective activity void of any social or moral value. Its mission is to focus only on empirical facts, from which as the positivists believe, no values can be produced. Also, the search for objective truth works with the sole purpose of empirical verification, independently of morality and self-conscience. The genealogy of the above argument traces back to the English empiricism of Hume and to the facts/values distinction that he introduced to the debate on knowledge. The absolute division between facts and values had close affinity to the realist theorization of the external view 'from the side of God'. The totality of the Greek and Western metaphysical tradition was founded on the firm belief that the mind mirrors an independent external world; as well as that knowledge claims (judgments) are grounded in the world and that the objectivity of judgments is understood from the prism of eternity. In the contemporary thought however, mind does not represent passively an independent, static and conceptually determined world; the function of mind is that of an active intervention, transforming this 'world' and by this action mind transforms also itself in a continuous interrelation. The world 'is' inherently uncertain and undefined and allows for an unlimited number of definitions. Knowledge claims are weaved within the context of a 'life-world' of human subjects in a given historical period. So, knowledge claims have a historic and temporal character and in this way the conception of the world viewed under the prism of eternity, is challenged. The view of the absolute theorization of the world and the

epistemological claim of universal truth is being further deconstructed by the developments in modern physics, which admits that any theory is perspective.

We see from this analysis that the traditional foundation-ism and the reduction to concrete convictions have been seriously undermined. What is acknowledged is that the intentional activity of consciousness is uniform and socially and historically determined and so the 'facts *vs* values' distinction becomes a logical distinction rather than a generic or causal one. To put it another way, it is the analytic rather than the ontological character of this distinction that has any importance for us today. Essentially, it is the end of the metaphysical and idealist division between 'Being' and ethics in the sphere of ontology (in which, 'Being' was autonomous to the subject); the division is maintained however, as a methodological principle of philosophical and scientific thought.

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