

About the Ontological Foundation of Natural Sciences

During the present Congress a series of questions have been raised from the side of natural sciences, especially mathematics and physics. The questions were articulated in an interdisciplinary way, addressed to philosophy. Hence, my intervention from philosophical side tries to answer to the raised questions, after having firstly reminded them in a summary way.

1) Some questions from natural sciences to philosophy

To my view the questions have a general content, not restricted only to mathematics or physics, so that I may articulate them — at least partially — in a general form under the following items concerning: a) the relation of natural sciences with human sciences and with philosophy, b) the ontological foundation of natural sciences, c) the ontological status of mathematical and physical objects, and d) the question of reality, raised by recent physics.

a) The question about the relation of the natural sciences with the human sciences and with philosophy

A first question concerns natural sciences, like mathematics, as theoretical ones, how they are related with human sciences like sociology and with philosophy. Contemporary mathematics makes a distinction between the theory of syntacs, presenting pure mathematics as mathematics, and semantics, showing this sciences in social context, understanding itself, for instance, as a community of believers. From another point of view, however, a pure syntacs, which offers only strings of symbols, seems to be a useless "Glasperlenspiel", what one can avoid only when recognising a relation of the theory to human practical life. Also the relation with theoretical philosophy, in contrast with the practical one, becomes questionable.

b) The question about the ontological foundation of natural sciences

The next question concerns the ontological foundation of natural sciences, in the sense that we may not neglect their reference to existing things. And it is challenged by our common sense. Yet against this assumption the objection can rise that possibly such a reference to things, existing independently from us, is a mere illusion.

c) The question about the ontological status of mathematical and physical objects

The third question upon the ontological status of mathematical and physical objects has been treated in this way: because of their abstract form they can be understood or as immaterial entities, like Plato's ideas, claiming a special intuition of our intellect, or as mere contents in our mind. However, the puzzling fact remains that the knowledge in our mind has been proved as related to concrete things, by applied technology. And the common sense seems to confirm it. Yet against this realistic proof of scientific knowledge the skeptical view-point remains that we have no evidence about the existence of concrete things. We can also doubt them so that we are forced to withdraw from the external world and to remain in the internal one of thoughts in our mind.

d) The question about reality, raised by recent physics

With this consequence the last question is concerned, especially in contemporary physics, because of the observation of increasing indeterminations or indeterminate phenomena in the subatomic field - a fact which made physicists problematise reality on the whole. In effect, the traditional realistic view of the world seems to collapse. What remains from reality or existing things could be only their appearances in our mind, whereas outside of it there would not be anything else than an indeterminable matter, as an unknown source X of irritation of our senses.

2) Taking position from philosophical side

Let me take now position to these questions, dealing with them in the same order as exposed above, because it has some logical consequence in it.

The modern claim that theoretical science has no relation to reality and therefore should be subordinated to practical social-political sciences, in order to get a link with human life, which comes out in practice, contains two questionable premises: 1. the empiricist premise that reality is only the empirical world experienced through sense perception, and 2. the pragmatist premise that human life consumes itself in actions. Against both premises our simple pre-scientific consciousness testifies 1. about intelligible features of reality, like those of our soul / mind and of God, which we cannot deny beforehand, and 2. about the fact that our actions presuppose our life activity which cannot be again a series of actions. Compare the scholastic doctrine: *agere sequitur esse*, considering human life as a mode of man's being, in contrast to every action which is a movement (with beginning and end).

Hence also the theoretical activities, in contrast to actions, have a reference to human life, even it can become a virtue of "theoretical life", as wisdom and happiness, according to the classical view, alien to modern pragmatism. As theoretical knowledge natural sciences can have a twofold importance for us: Firstly an ethical one, because we can arrive to a good life only with a certain self-knowledge, and this requires to see man in the larger context of the world, including its material side, too. Natural sciences provide us with some insight in the material side of man existence in the world. Secondly an anthropological importance, because every theoretical knowledge, as activity of the intellect, has as such an effect on man's being, because intellect is the highest principle in the human soul, above the vegetative and the sensitive principle. Indeed, the soul is the cause of life, so that the intellect is a life principle in man, and its activities qualify our human life, accordingly to the kind of knowledge it exercises. And the quality of the cognitive activities depends again on the quality of the object with which it is occupied.

a)

Concerning the ontological foundation of the sciences, a historical record is helpful: Indeed, Aristotle introduces his metaphysics on "being as such", comparing this science with the particular ones: Whereas every particular science makes research on a specific object, in a determined field of reality - mathematics on things as measurable quanta, astronomy on moving bodies in the universe, biology on living beings, medicine on the living organism as healthy and ill etc. -, presupposing in every field that the objects are there / exist and are something at all, it is only metaphysics which takes this presupposition of the other sciences as

its own formal subject, thematised in the “being *qua* being”, i.e. the things in so far as they simply are. Metaphysics starts then its own question for the causes of being, by which things are.

It is our common sense, more precisely: our natural consciousness of reality which corresponds to the simple being of things — that is: the objects as well as the thinking subject. The evidence that there are things independently from our thinking and consciousness is even so great as the evidence of our thinking ego. In the famous doubt of Descartes an empiricist premise is hidden, taking the existence of the external things as a mere sensible datum, in space and time, — what is false. Being, just as simple being there, is nor visible, nor audible, nor to smell or to taste, but is grasped only by intellect, to which the things are present. Indeed, existence is a formal intelligible aspect of the sensible things as well as of the soul or intellect itself. How could we else use the same term “existence” of both realities, objective and subjective? However, in Descartes’ philosophy the classical doctrine of the analogy of being has been lost.

b)

With regard to the question of the ontological status of mathematical and physical objects, the above-mentioned alternative seems to me unsatisfactory which considers the status of these objects or as Platonic ideal entities or as mere products in our mind. Aristotle who already confronted himself with the problem of Plato’s mathematical objects, offers a satisfactory solution, which is neglected nowadays, namely that the mathematician deals with these objects as if they were independent things, whereas in fact they are abstracted forms in our mind, having, nevertheless, a *fundamentum in re*, that is: a reference to quantitative structures in the material things themselves, which are, however, in another mode as in that one in which the abstract forms are in our mind.

It is noteworthy that exactly in this context Aristotle introduced, for the first time, the term “abstract” which became then so basic in the Western philosophy.

c)

As to the last problem, concerning reality which becomes today always more questionable on the ground of the indeterminations, observed in the subatomic field, I may point to a methodological fault when the physicist put the question of what is reality, because the term “reality” is a metaphysical one. Therefore, only the metaphysician can explain what reality is. According to the classical metaphysics reality is a transcendental feature of every being.

In addition, modern physics, which originated from the traditional natural philosophy, has been separated from it later on, losing out of sight the fact that it is only researching in one of several causes of natural things, namely in their matter. Hence the physicist is not occupied with the whole nature or "the reality" because there are other, not material causes in natural living beings — i.e. formal efficient and final causes — which are far more responsible for the reality of things. As to matter Aristotle's natural philosophy teaches us that it is "in itself indetermined" and "unknowable". Therefore, when today indeterminations are observed in matter, one must not be disturbed or put in question the whole reality. Rather, on the contrary, one could be astonished that in matter is still so much determination, structure and regularity so that sciences have construed upon it.

In conclusion, the reflection on the ontological foundation of the natural sciences should not start from empiricist premises according to which there would not be an unchangeable being and the question of what is real had to be proved always again by experience. In truth, however, an unchangeable aspect is found already in the simple being there (existence) and being something of natural things, with their ontological identity (being something, one, true, real and good). As to experience, this cannot be the last criterium of our knowledge because experience itself relies on an ontological presupposition, namely the being of things. And to this only our natural consciousness corresponds which is the condition also of experience.