Deformation of form

Vojislav Likar

We are not likely to achieve a clear conception of the status of the concept of form in the sphere of contemporary knowledge by »examining« dictionary definitions. Such study of definitions does not give anything but a more or less – which depends on our eargerness – extensive set of definitions that illustrate, first, all the abundance and variety of the modalities of notional connections that a particular concept enters. Second, they illustrate the whole range of historical metamorphoses of its content and, finally, all the philosophical aspects of these implicity or even declaratively neutral vocabularies, encyclopedias and compendia. We by no means want to say that study of dictionaries should prove superfluous and fruitless, and still less, of course, that dictionaries themselves are unnecessary and useless.

On the contrary. We believe, however, that their primary importance – speaking of philosophical lexicons at least – lies in the fact that they call our attention to the multitude of meanings and definitions of a particular notion and present them to us, confirming the plurality of philosophical theories that stand behind individual definitions. In short, they make us feel entitled to believe in fundamentally open and philosophically unconditioned possibilities of our initial choice, as well as in the fact that no critique is possible on this level, let alone hierarchization of philosophical positions from the positions themselves.

So vocabulary definitions of notions show us in the first place, what in an other connection and in a different context Gaston Bachelard called the profile of the notion. It was equipped with the attribute epistemological (because of the character of scientific concepts), whereas in a philosophical context we would rather add the attribute archeological (e.g., in quasi-Foucaultian meaning of the expression). Without any special difficulty, it can be presupposed that the archeological profile of the concept such as form cannot develop in some uniform even line, considering the fact that since Aristotelianism it has no longer played the role of the philosophical technical term, but has been one of the most common and most frequently used notions, a category that has also appeared outside the sphere of philosophy in practically all the fields of theoretical knowledge. Let us end the introduction by repeating that the lexical definition cannot help with the initial clarification of the question that we are interested in and that can be summed up as follows: does the concept of form play any special role in Bachelard's epistemology,

and, if so, what are its function and importance to the conceptual and theoretical constitution of his epistemological theory?

We will try to answer the question in that part of Bachelard's opus where, in his epistemological analysis, he centers on the theory of the concept, or, more precisely, the theory of conceptualisation, for Bachelard finds the analysis of the process of its generation and formation to be of greater importance and theoretical interest than the analysis of the already-fixed and stabilized concept. Therefore, we will be interested primarily in Bachelard's theory of approximation in his earliest work, *Essai sur la connaissance approchée* (1927), which represents a more or less implicit critique of the then-prevailing epistemological approach to the problem of cognition in general and scientific knowledge. In his first work, Bachelard did not yet explicitly thematicize and reflect the object of the critique itself, i.e., the problem of (non)-pertinency of the analysis of scientific knowledge and its results, with the means and on the basis of the philosophically conceived theory of knowledge.[1] Nevertheless, he emphasized already that every attempt at the description, analysis and explanation of cognition as a complex, multilayered articulated process should constantly resist and protect itself from the temptation to determine beforehand the initial, original conditions of the coherence of thought and to formulate them as universal conditions of the synthesis of knowledge.

Bachelard turned this emphasis into the basic axiom of his epistemology. With it, he rejected the possibility of and denied pertinency to every philosophical treatment of scientific activity that would try to approach the problem of scientific knowledge from the already-formed philosophical position and already equipped with a transparent model of the structure of a scientific theory. In short, every philosophical approach to the analysis of scientific thought and the theoretical activity of science in general that originates in its own, outside of a concrete science conceived and formed model of cognition, in the model that receives its configuration and consistency from the philosophical theory itself, in sciences but selects and searches for examples that ultimately only confirm the correctness of this philosophical theory. Bachelard believes that the problem of cognition, if put philosophically, turns inevitably into the *universal* problem of cognition, into the problem of determination of the universal, therefore universally valid, conditions of the objectivity and veracity of cognition. Yet these conditions and frameworks of cognition define in fact »philosophical cognition«, and therefore illustrate the formation of universal notions and categories that cannot be identified with any concrete and particular scientific concepts. The problem of cognition formulated as the problem of the universal model of thought that already secures the objectivity of cognition represents to Bachelard a problem that is

1. He did this most concisely especially in the preface to his book *La Philosophie du non* (1940), P.U.F., Paris 1975, pp. 1-17.

evidently quite alien to, and incompatible with, the nature of scientific thought and with any concrete ways of the formation and production of scientific concepts and cognitions in contemporary sciences. Therefore, if philosophy no longer wishes to force its own epistemological models on the variety of sciences or, what is actually the same, to interpret scientific knowledge by casting it in the already-elaborate philosophical molds, it must set to a thorough and detailed examination of a concrete scientific practice, i.e., it must try to unfold the epistemological structure of scientific knowledge. The kernel of scientific knowledge, however, its main and also leading element, is scientific conceptualisation, i.e., modalities of the formation of scientific concepts. It is only through analysis of the procedures of scientific conceptualisation that it is possible to comprehend the methods and ways in which cognitions are formed in a scientific practice, to establish the norms that determine and secure their objectivity, and to discover conceptual frameworks and networks that make possible their coordination and organization into the form of the scientific theory.

The fact that we can get no clear idea of the nature of scientific knowledge without scientific conceptualisation being explained as its kernel proves that scientific knowledge is *a process* and should as such represent the object of our research. To study the process of a scientific knowledge in the concreteness of a scientific practice means to study cognition in its life, its movement. From the fact that scientific knowledge is *a process* it can be inferred that scientific truth, which it results in, cannot be reached *en bloc,* with a single act, no matter what nature and power may be attributed to it. Scientific truth cannot be the result of some momentary cognitive flash of wit, a momentary contact of two opposing components – the knowing subject and the object of knowledge – that constitute the philosophically apprehended binary structure of cognition.

Therefore it cannot be shelled out of a particular cognitive act that we would manage to separate and isolate from the cognitive process. On the other hand, scientific truth is far from being a mere sum total of a linear string of atomic acts. Scientific truth is not some kind of integral, a whole achieved only by the complete integration of all the elements that represent the sequences of the cognitive process. So it is not something that is present as a kind of partial truth from the very beginning and at each particular isolated moment. On the contrary, according to Bachelard, the practice of contemporary sciences gives quite a different picture of the nature of scientific truth, and of the character of cognitive processes and experimental procedures whose product it is. Scientific knowledge is a result of a complex, articulated process that consists of series of conceptual as well as experimental precisions, rectifications and approximations. Its complete significance of objective scientific truth is reached at the end of some relatively determined *temporal* of *historical*

perspective. Such a conception of scientific knowledge is obviously incompatible with the philosophical conception, either in its a priori idealistic or its empirical version. In his critique of such philosophical conceptions, Bachelard more or less neglects the latter but strongly opposes idealistic theses in the first place. This can be explained by the fact that Bachelard himself argues for the rationalistic position in philosophy; yet his rationalism is most strongly connected with the specific, let us say scientific, form of rationalism, the form of which is the very negation of classical (Cartesian) rationalism. So the tasks of the critique of idealistic conceptions should also include the prevention of any identification of rationalism that presents itself in contemporary scientific practice with various forms of the idealistic derivations of classical philosophical rationalism.

The idealistic conceptions of knowledge – and Bachelard thinks primarily of Kant here – usually find or postulate the subject at the decisive factor and the guarantee for the convergence, veracity and objectivity of knowledge. According to Bachelard, such a conception of knowledge results in essentially homogeneous truth that discovers its criterion in the harmony of thought with its own self. Such knowledge, based on the structure of subjectivity, must have its own systematic order, of course; it must possess a well-arranged register of methods and rules of construction that secures the coherence and firmness of cognitions. »A'aucun moment la connaissance ne reste sans système puisque la réalité n'est effectivement donnée que dans la mesure où elle accepte les catégories *a priori* de l'esprit.«[2] The elements and components of the cognitive act are shut in its own structure; cognition appears necessarily achieved. To the idealistic conception, the cognitive act always seems complete, full, closed to extension. This, in fact Kantian, vision of the cognitive process is actually extraordinarily consistent and firm within its own definitions and framework. It is true, however, that it also calls for an extremely complicated and multilayered system of methodical rules that determine the steps of cognitive activities and the places in their topological structure that are continually occupied by the knowing subject.

The clearest picture of the extraordinary sophisticated construction of such a philosophically elaborated cognitive sample may be offered by Husserl's phenomenology – in a certain sense the most perfect and historically the last form of philosophical, or better to say epistemological idealism.

In phenomenology, the objectivity and apodictic veracity of cognition are reached on the transcendental level, within the sphere of the noetic-noematical structure of transcendental experience after this experience has been purified, through the procedures of phenomenological reduction, of all naive beliefs, the beliefs that are unreflectively given by tradition, and after it has been freed from the contingency of the natural world by the suspension

2. G. Bachelard, *Essai sur la connaissance approchée*, Vrin, Paris 1927, p. 12.

of traditional assumptions. It should be pointed out that, together with various convictions and truths that are handed down by tradition, the entire field of scientific knowledge, too, gets struck by phenomenological reduction as the main procedure whose »strategic task« is to avoid the position of naturalism and to achieve a rise to the transcendental level of pure experience. The argumentative ideal that drives philosophical theory in its efforts to reach and protect the solid grounds where the objectivity and veracity of cognition would be *a priori* secured, turns into the projection of the pure eidetic science of transcendental phenomenology, representing the rigorous science that can provide the variety of empiric sciences with basic categories and clear concepts. It is as a specific form of »the interiorization of science«[3] that we can describe accurately enough the procedure carried out in this connection by philosophy in general, and presenting itself in the concrete sample of phenomenology roughly speaking, as the reduction and purification of empiric content and the references of consciousness and as a simultaneous rise of consciousness to the transcendental level, where the evidence and apodictic certainty of cognitions are secured already by the realization of the phenomenological method itself.

Consequently, the critique of the idealistic conception of the theory of knowledge would be logically expected to aim in the first place at its basic, yet at the same time the most vulnerable, point, i.e., the transcendental constitution of the cognitive apparatus. Bachelard, however, took up a completely different point of view. He proceeds from the conviction in which he is backed up by the history of philosophy, namely that every critique that remains strictly within the notional framework and horizon of philosophy, as a rule just shifts theoretical attention from one to another aspect of knowledge, correspondingly moving its emphases, too. So philosophy keeps getting involved in the forms of argumentation fixed with its historical tradition, where varieties of the empiric conception prevail at one time and those of the idealistic conception at other times, whereas its optics, in principle, by no means manages to catch in its focus the complex dimensions of the concrete scientific practice.

Therefore Bachelard raised a radical and, from the view of its tradition, most heretical demand on philosophy: philosophy should approach sciences in their actual form, even more, it should open its conceptual register and rearrange it so that it could interfere theoretically with the conceptual apparatus of scientific discourses. Consequently, it is necessary to redirect thoroughly philosophical optics to the real practice of science in its theoretical and experimental dimensions. According to Bachelard, it can be expected that we

3. The expression is borrowed from J. T. Desanti. *Cf.* his essay »Sur le rapport traditionel des sciences et de la philosophie« in the book *La Philosophie silencieuse* (Seuil, Paris 1975), where he analyses various aspects of this interiorization, which represent the historical forms of the philosophical foundational approaches to scientific discourses.

will be able to approach the understanding of cognitive processes going on within sciences and determining their progress and with them also their history apprehended in recurrent perspective only if we manage to move, metaphorically speaking, the philosophical discourse from the comfortable topos of the fixed philosophical system and to open and qualify it for the perception, recognition and reception of the theoretical content that is constantly produced and modified in the very kernel of scientific discourses.

So what follows from Bachelard's demands, which are, regarding their nature of normative character, i.e., they obtain the form of rational presuppositions (and limitations) for the constitution of epistemology as the theory of the formation of scientific concepts? What is their, so to say, immediate result as soon as the philosophical discourse in accordance with those principles draws near a concrete scientific activity? First, it is undoubtedly the statement that in actual scientific practice there are at least two clearly distinguishable moments that speak against the traditional, especially idealistic, philosophical conception of cognition. These are on the one hand *the fact that scientific knowledge is a process that is in perpetual motion, progressive development and change,* and on the other hand *the existence of the error* that can be neither denied nor completely eliminated.

Both elements exist on two different epistemological levels: the first one on the macroepistemological level, where it comprises entire theories, or better to say, a corpus of concepts and theories that constitute a certain region of scientific knowledge, and the second element on the microepistemological level, where it »endangers« and »contaminates« all the levels and segments of scientific conceptualisation as well as the corresponding experimental applications. There is a close connection, of course, between the two elements in the epistemological structure of scientific knowledge. The first one, namely the progressive course of scientific cognitions and the parallel progressive modification and transformation of all the components of the cognitive practice itself, can be accurately apprehended as the outer visible form of the dynamics caused by the continuous rectification of errors. Yet the very existence of the error, which proves to be an inevitable constituent of the scientific activity, represents one of those decisive factors that determine scientific knowledge as essentially approximate. The existence of error certainly should be located in the subjective pole of the cognitive process, i.e., within the sphere of scientific thought. Therefore, this Bachelard's epistemological detection of the moment of error in the speculative segment of cognition affects the idealistic conception in its very heart, for it reveals a certain gap in its constitutive category, in the subject and its rational structure. Yet there is still another factor that conditions the approximate character of scientific knowledge: this is reality itself, the very reality that science regards as the object of its research. The nature of this reality was described by

Bachelard as follows: »Cette réalité présente dans son inconnu inépuisible un caractère éminemment propre à susciter une recherche san fin. Tout son être réside dans sa résistance à la connaissance.«[4] The inexhaustable wealth of the (still) unknown and the fact that reality endlessly resists cognition are the two features of the objectual field of the cognitive process that prevent the perfection and finality of the cognitive act. So for Bachelard, the basic inachievement of cognition becomes a postulate of epistemology, which, of course, thoroughly changes the perspective of the analysis of cognition, and above all the valorization of its principal components.

Solid grounds for the change of perspective, i.e., for the shift of the theoretical standpoint from which the analysis of cognitive activity in sciences can take its course, evidently could not be reached in Bachelard's epistemology through philosophical contemplation, but instead through the very transgression of the traditional conceptual frameworks of philosophy, and with its radical reconceptualisation. This could be accomplished only by means of the rational revaluation of the individual philosophical notions and categories, performed in accordance with the norms of the scientific discourse. So the very notions (e.g., error, approximation, rectification, approximative cognition) that the theory of knowledge tried to remove from the speculatively marked frameworks of cognition as negative and limitative elements underwent the procedure of epistemological revalorization. In Bachelard's theory, all these notions acquire positive content, which is not the result of a simple turn, however. It gets its rational justification from an insight and investigation of the real scientific practice in its complementary theoretic-experimental dimension.

The notion of error, for instance, is no longer apprehended as a negative factor in the process of scientific knowledge: it is neither some kind of impure element that attacks and lowers the level of the objectivity of scientific knowledge nor something that as »unhappy coincidence« or »a slip« could be translated into the empiric fact of the mistake, which can be, if nothing else, psychologically explained at least. The error, which was comprehended in its essence as a pure negativity by traditional philosophy, turns into a positive epistemological concept. »L'erreur est un temps de la dialectique qu'il faut nécessairément traverser. Elle suscite des enquêtes plus précises, elle est l'élément moteur de la connaissance.«[5] What follows from this moving principle of scientific knowledge are the corrections, revisions, reorganizations and rectifications of concepts and theories, performed in a way that in the final perspective, or better to say, in the recurrent view of epistemology, scientific truth shows itself as a series of rectified errors, bearing the appearance of approximate knowledge (connaissance approchée). In the same way as error, the notions approximation and approximate knowledge, too, lost

4. G. Bachelard, *op. cit.*, p. 13.
5. G. Bachelard, *op. cit.*, p. 249.

their negative sign in Bachelard's epistemology. They no longer symbolize epistemological relativism, which was ascribed to empiric sciences by philosophy, thus creating a pretext for its own foundational intentions.

Contemporary science (and it is in this that Bachelard saw one of the main characteristics of modernity) has reached such a level of epistemological autoreflexivity that it can, with its own means, establish and rationally justify theoretical norms and experimental standards within which its research achievements are objective and valid. Science themselves have rejected the cognitive illusion (which philosophy used to share with them) belonging to their pre-scientific period and referring to the need for the unlimited accuracy and the purity of the cognitive process, both in its empiric as well as speculative dimension. The key to the understanding of the objective reach and validity of scientific knowledge is therefore the concept of approximation, or more precisely, the dynamics of approximation – rectification. The epistemological analysis is performed in the sphere of approximation and becomes the theory of conceptual rectification.

The progressiveness and dynamics of contemporary scientific thought cannot be satisfactority explained if the structure of scientific thought is apprehended as a mere accumulation of permanent rational forms, expressed in isolated, fixed and unchangeable concepts. On the contrary, epistemological analysis reveals that scientific concepts reach their full significance only within the complexity of inter-conceptual relations. But as soon as a scientific concept enters a theoretical relation, i.e., as soon as it is applied to some judgment, its structure gets diversified and modified. Therefore according to Bachelard the criterion of the theoretical fertility of a particular concept cannot be the fixedness and closure of its form: »... la richesse d'un concept scientifique se mesure à sa puissance de déformation.«[6] If we are to comprehend the new statements offered by scientific experimentation, we must deform the original or initial concepts, and study over the conditions of the application of these concepts. Moreover, the conditions of its application must be incorporated in the concept itself. Only if these conditions are already integrated in the structure of the scientific concept, the extension of its cognitive capacities is possible.

The dynamic history, the very progress of scientific thought, is written in these extensions, which every time follow the theoretical deformations and rectifications of scientific concepts: »C'est au moment où un concept change de sens qu'il a le plus de sens, c'est alors qu'il est, en toute vérité un événement de la conceptualisation.«[7] If we paraphrase Bachelard's statement, we can give the following, seemingly paradoxical answer to the question raised in the beginning: the very truth of form lies in its deformation.

6. G. Bachelard, *La Formation de l'esprit scientifique*, Vrin, Paris 1975, p. 61.
7. G. Bachelard, *Le nouvel esprit scientifique*, PUF, Paris 1978, p. 56.