

Discussion

Pro and Con Discussion Regarding the Tenets of the Hermeneutic Philosophy of Science

Since the late 1960s studies in the hermeneutic philosophy of science have been gaining currency. In looking at this development from a historical perspective, one can today recognize an independent philosophical tradition. Scientific research is committed to the universe of interpretative phenomena – so the tradition's guiding tenet goes – since it is itself a hermeneutic process. To put it in an extended formulation, those phenomena which philosophical hermeneutics unveils in the being of history, language, and art can also be identified in natural science as a particular mode of being-in-the-world. This is a radical claim that provokes a double confrontation. On the one hand, the hermeneutic philosophy of science opposes the mainstream philosophical picture of science which is spelled out predominantly in terms of objectivism, epistemological representationalism, and cognitive essentialism. On the other hand, a conflict with traditional philosophical hermeneutics is inevitable. On this traditional

enterprise, a constitutive view of interpretation might be integrated into a theory of scientific communication, but by no means into a theory of scientific research and knowledge. Due to this double confrontation, the hermeneutic philosophy of science brings into play several interesting debates of general philosophical importance. This tradition is a target of criticism from positions as different as neo-scholastic ontology and neo-positivist epistemology. The publication of Professor Arvin Voss's article documents our desire to initiate on the pages of the *Balkan Journal of Philosophy* an ongoing pro and contra discussion regarding the tenets of the hermeneutic philosophy of science. To be sure, Professor Voss's elegant criticism of the hermeneutic view about the status of science's theoretical objects as well as his rehabilitation of essentialism concerning the constitution of scientific knowledge will meet a counter-criticism devised by the exponents of an interpretative turn in the philosophy of science.

ON THE STATUS OF THEORETICAL OBJECTS IN SCIENCE ACCORDING TO COGNITIVE EXISTENTIALISM

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In recent work Prof. Dimitri Ginev has been developing a view of the nature of science which he calls "Cognitive Existentialism." These subtle and detailed analyses call for much more extensive comment than I could possibly make here. Accordingly, I am going to limit myself to examining a single, fundamental issue: the status of theoretical

objects in science. As Ginev states, the "doctrine about the status of science's theoretical objects constitutes the kernel of cognitive existentialism" (Ginev 2009, 382). Again, he elsewhere states that his goal is to describe "the 'immanent transcendence' of science's theoretical objects" (Ginev 2006, pp. 124–131). Both the immanence and the transcendence of

theoretical objects are significant: the *immanence* because it is Ginev's means of countering essentialism and *transcendence* because it is necessary to account for basic features of scientific research.

My comment will have three parts: first, a brief account of the nature and status of theoretical objects in Ginev's account of science; second, an account of some difficulties that I find with Ginev's account of "theoretical" objects; thirdly, it will be argued that these difficulties have their source in the fact that implicit in Ginev's position is an understanding of knowing that is essentialist with the result that he eliminates significant features about knowing in order to avoid essentialism. Finally, I will argue that there is an alternative account of knowing which avoids the problems of essentialism and is more adequate in accounting for the facts of knowing, specifically the role of theoretical objects in science. This claim will be argued first by sketching briefly an alternative conception of the origin, nature, and role of theoretical objects. Secondly, it will be shown that this alternative approach has the capacity to resolve the issues that remain puzzling in Ginev's account of the constitution of science.

In short, I shall argue that Ginev has failed to break cleanly with the fundamental assumptions about knowing on which essentialism is based and the result is that his own account of the role of theoretical objects in science is insightful, but ultimately not fully satisfying.

I. On Science's Theoretical Objects

Cognitive existentialism aims to give an account of theoretical objects in science. The problem, as Ginev sees it, is to give an adequate account of the role of theoretical objects as they function in science without lapsing into some form of essentialism. Positively, for Ginev this means describing the role of theoretical objects in science purely in terms of scientific practices. Negatively, it means avoiding all implications that theoretical objects are cognitive essences: "There is no 'essence' behind or beyond the interrelatedness of practices" (Ginev 2009, 366).

How is meaning constituted? Or, to ask the question in another way: how do theoretical objects arise? Ginev's answer is that it is through "appropriating (actualizing of) possibilities through interpretation." Again, it is said that scientific research, a mode of being-in-the-world, "projects its existence upon possibilities." How does this occur? It is through this appropriation that "an ongoing articulation of a domain's research objects comes into be-

ing" (Ginev 2009, 381). *Appropriation* and *articulation* are two ways of describing how a scientist applies a theoretical object to a new situation, a new context, to another instance or instances of what was before only a possibility, something not yet known. An added aspect is that theoretical objects are "constantly undergoing small changes in normal scientific research due to their 'recontextualization' in new configurations of practices" (*ibid.*). In other words, the range of data to which a theoretical object is applied constantly expands. These statements document Ginev's sensitivity to the contextual nature of scientific reflection and the incremental development that is characteristic of normal science.

But what is appropriation? How does it occur? According to Ginev scientific research is "a mode of being-in-the-world" through which Dasein projects its being upon possibilities. Also, through appropriation "a domain's research objects come into being". Both aspects are significant and will need to be examined in more detail. However, in this context Ginev is quick to affirm the anti-essentialist nature of his position: "the ongoing hermeneutic restructuring of [a] domain's cognitive structure is not behind or beyond the interrelatedness of practices" (Ginev 2006, pp. 135–139). The very fact that Ginev feels the need to reaffirm the anti-essentialist character of cognitive existentialism suggests that the matter is not entirely settled in his mind. In any case, the denial of essentialism does nothing to explain the origin of this cognitive structure, its dynamics, or its organizing principle.

Why such explanation is needed can be seen from the fact that Ginev adds an account of the nature of this cognitive structure. He notes that "a domain's research objects are always related to theoretical objects that are not present at hand in normal scientific everydayness" (2008, 237). The problem is to explain how research and theoretical objects are related. For Ginev a domain's "research objects" seem to be the individual instances or the materials that are found in the laboratory or are the things being studied in a research program. In other words, research objects are the particular chemicals, even the individual sample, which a chemist uses in his work, or the particular plants which the biologist studies when studying the growth of wheat for example, etc. In contrast to these specimens "theoretical objects...are not present at hand." Rightly, it is recognized that they have a different status. Ginev goes on to explain that "the theoretical objects always already transcend the actual configurations of

practices.” This fact leads Ginev to conclude rightly that there is a “‘content’ of these objects that cannot be exhibited by the models constituted by the configurations in progress” (Ginev 2009, 382).

What is this “content” and how does it arise? For Ginev there is no simple answer. What seems to concern him most is to explain that this admission of a “content” does not open the door to admitting “‘cognitive essences’ which are...independent of the dynamics of practices of normal scientific research [and which] even determine this dynamics”. Research practices, we are told, do not serve the function of “‘operationalizing’ theoretical objects” (Ginev 2009a). The Platonism (and hence essentialism) of this rejected position is readily apparent.

But clearly it is not enough to say what theoretical entities are not; one must say what they are, how they arise, and how they function. And so we need to follow Ginev’s account closely. Instead of being essentialist in character, “theoretical objects do not exist *per se*...” but have a “potential being.” This potential being stems from the fact that they can be identified “through the ongoing actualization of possibilities from the horizon of projected possibilities” (2008, 234). Another way in which the potential character of these entities is described is in terms of having “both a ‘visible existence’ (actualized theoretical possibilities under certain experimental conditions) and ‘invisible existence’ (possibilities that might never be ‘appropriated by the configurations of scientific practices)’” (2009, 382). Again, science’s ‘theoretical objects’ have potential being because they “project its [science’s] existence upon possibilities” (2008, 236.). For Ginev this potential-being claim about the nature and role of theoretical objects in science is the fundamental claim of cognitive existentialism.

Ginev explains the status of theoretical objects in more detail. Science’s theoretical objects are “predicated on a double status”—as “embedded in the hermeneutic fore-structure of scientific research and in the structure of a scientific domain” (2009, 380). The latter claim is fairly obvious, for theoretical objects – here I would prefer “theoretical terms” – constitute the conceptual structure of every field of science. The first point is both more significant and more difficult. What is meant by the “hermeneutic fore-structure of scientific research?” Ginev states that theoretical objects are “‘partially’ present at hand and ready to hand in research practices.” His explanation of this status is that they exist “through

(2006, 137). Why theoretical objects are only “partially” present at hand and ready to hand is not explained.

A further clarification concerns the means by which theoretical objects are grasped. It is asserted that a transcendental reflection is required in order to grasp the status of these theoretical objects. The situation is parallel, according to Ginev, as reflection on the hermeneutic circle. The status of science’s theoretical objects is “revealed by the same transcendental reflection that unfolds the hermeneutic circle between fore-structure of interpretation and explicit structure as the very circularity is mediated by the interrelated practices of normal scientific research” (2009, 383). This last claim is the heart of Ginev’s position. Through a transcendental reflection he believes it is possible to show that the practices mediate the relation between a scientist’s anticipations, expectations, and orientations and the explicit structure, the theoretical objects, of his field of research.

The result, according to Ginev, is a situated transcendence. Situated transcendence is not “empirically given, but it conditions the empirical dynamics of scientific research” (2009, 383). Such reflection reveals the self-referentiality of scientific research, “that one understands oneself with respect to the possibilities...already projected in one’s practices” (2009, 384). Again, if I engage in scientific research “the choice and appropriation of possibilities” are my actions, so have “reference to...[my] being-in-the-world” (2006, 51). Thus, “a structure of self-referentiality” coincides with the “structure of meaning constitution.” Because the same will be true for other researchers, self-referentiality is a “trans-subjective phenomenon,” because of the situated transcendence in which each finds oneself.

Finally, for Ginev this way of treating self-referentiality leads to a “double hermeneutics”—“the process of interpretative constitution of meaning on the level of the empirical dynamics of practices,” and the “moment of situated transcendence in this dynamics” (2008, 235). Opposing what he sees as an insurmountable dichotomy in Heidegger’s onto-ontological difference, Ginev insists that there is no “autonomous transcendental-ontological knowledge.” The only adequate account is based on “contextual transcendental knowledge” (2009 a).

II. About Theoretical Objects

Ginev’s subtle and nuanced account invites thoughtful response. Two concerns dominate his

discussion: on the one hand, there is his concern with avoiding any hint of essentialism; on the other, contextualizing all constitution of meaning in practices is seen as the way to accomplish this goal. I find myself in agreement with Ginev's goals. I agree that essentialism has many problems and must be rejected. And I also agree that the constitution of meaning must be contextualized. While agreeing with Ginev's goals, I have reservations about his solution, for it appears to me that Ginev has not broken completely and cleanly with the basic assumption in the essentialist account of knowing. While he rightly rejects the results of an essentialist view of knowing, rejecting the metaphysics, epistemology, and conception of objectivity found in this view, he fails to identify and critique the fundamental misconception that is the source of the many problems in essentialism. As a result he remains caught in a number of issues that are found in the essentialist framework. What Ginev fails to critique are the essentialist's assumptions concerning the nature of knowing. This failure has multiple consequences, especially for his account of the status and role of theoretical objects. It appears to me that because Ginev fails to discover a more adequate account of knowing, he is forced to account for theoretical objects in science by focusing solely on practices. Or to put the point in another way, he insists that in his view the theoretical objects of scientific research have only an immanent transcendence, but he fails to show how this is not a kind of essentialism – in spite of protestations that his view is not essentialist. In short, in order to avoid essentialism – the view that in some way ideas exist apart from mind—he describes theoretical objects purely in relation to practices. In this section I will note some of the problems that it seems to me remain unsolved in Ginev's account of science.

Practices have a significant role in science, and so Ginev rightly focuses on them but nowhere does he indicate how practices give rise to theoretical objects. To say that theoretical objects arise in the context of practices is not enough. One wants to know why they arise in this context and how? The question cannot be avoided because clearly such objects are necessary to account for the generality of scientific knowledge. To put the point in another way, they are required to explain both understanding and interpretation, both that they are generated in a particular research situation and that they identify a range of possibilities that can be actualized in an indefinite number of other settings. It is awareness

of these factors that lies behind Ginev's affirmation that, unlike research objects, theoretical objects are not present at hand.

A second question also relates to theoretical objects, but here the focus is on the fact that they go beyond "configurations of practices" (Ginev 2006, pp.75–92). When one reads that a theoretical object goes beyond configurations in progress, one immediately suspects that a theoretical object is "an invariant theoretical object," which is precisely what the essentialist claims. How is the situated transcendence of these theoretical objects different from the essentialism that Ginev is opposing? If theoretical objects are not "present at hand" and in this way are different from research objects, and they "transcend the actual configurations of practices," is this not exactly what the essentialist is also claiming? Ginev does not tell us how he avoids this conclusion. To say that they are discovered in the context of practices is not enough. Even Plato in the *Meno* asserts the same. Plato underscores the need for inquiry (86b), but insists that what is discovered is a form or idea that is known in a prior life. It is not enough to say, with Plato, that theoretical objects – *forms* or *ideas*, call them what you will – are discovered in the context of inquiry or research. It is necessary to explain how this occurs.

Thirdly, scientists set themselves the goal of discovering something that is general, that is, of arriving at a result that is not limited to "configurations in progress." The goal is to arrive at a single formulation which will account for all similar cases. Consequently, the peculiarities of individual objects do not concern them. This explains the practice of selecting specimens for research which are, so far as possible, free from confounding factors. Thus the water used in research will not be from the local river, but distilled water, the chemicals 99.9% pure, the population surveyed selected with regard to specific criteria, etc. The rationale for this selection is that a researcher wishes to discover something that remains the same in all instances of the kind of thing being studied. To isolate such a factor requires excluding the peculiarities of particular cases, so far as this is possible. In scientific research one is interested in a particular specimen only in so far as it is representative of an indefinitely large range of instances of the same thing. In other words, scientists are interested in finding a theoretical object that will account for an indefinite number of individuals. The significance of the theoretical object is that it can be used to identify an unlimited number of instances of

the same kind of thing, an indefinite number of possibilities in other words. The goal of reaching an object that identifies a class or set of things seems to be a fundamental part of all scientific work. Does this mean that scientists themselves are essentialists? Other than pointing to the context of practices, Ginev does not clarify why this is not the case.

A fourth concern is that the reflection on the status of science's theoretical objects is like the problem of the hermeneutic circle. In a rather turgid sentence we are told that "the status of science's theoretical objects has to be revealed by the same transcendental reflection that unfolds the hermeneutic circle between the fore-structure of interpretation and explicit structure," because "the very circularity is mediated by the interrelated practices of normal scientific research" (2009, 383). The key question is this: What is the meaning of "mediated?" The parallel may be instructive, but now one faces dealing also with the problem of the hermeneutic circle.

Finally, a more general comment. While Ginev's account of the constitution of meaning is nuanced, noting the changing configurations characteristic of even normal science, and again the progressive articulation or appropriation of possibilities, nevertheless one is left with the impression that this account of science is from an external point of view, an account of it as a phenomenon spread out in space and time, and in terms of results, rather than seen as arising though some inner dynamic found in each and every scientist, and whose shared questions are the basis for cooperation in a field. No doubt there are references to scientific research being a mode of being in the world of Dasein, many references to "self-referentiality," and even mention of "the interpretative nature of human beings" (Ginev 2009a), but what this interpretative nature is and how it operates is not explored.

III. An Alternative Account of Theoretical Objects

Ginev asserts that theoretical objects arise in the context of practices. While true so far as it goes, this is not saying enough. It is more accurate to say that theoretical objects arise in the context of inquiry. To inquire is to ask a question, to ask *what?* or *why?* or *how?* Inquiry is an activity of an inquirer, of a subject; it is a mode of being of Dasein. Also, a question is a response to some experience, something which one has seen, heard, or noted in some way. The "ready-to-hand," to borrow a phrase from Heidegger, ceases to be just familiar, but also becomes

strange, or puzzling. What was merely there as a familiar object is now "seen afresh" and recognized to have aspects or elements which have not previously been noted. In short, we begin to wonder, and if time and energy allow, inquiry follows.

Beyond the genesis of inquiry, it should be added immediately that we never just question, but that our questions arise in a context. Certainly this is true with regard to the present discussion, scientific research. And so, it must be added immediately that we do not just inquire, but we inquire with certain presuppositions or expectations, what Bernard Lonergan has called "heuristic structure" (1992, Chap. 2, "The Heuristic Structures of Empirical Method," 57–90). Modern science has a long tradition that is unified by such expectations. One illustration will suffice. In the context of scientific research, we investigate only hypotheses which have some kind of sensible consequence which can be observed. Hence, a hypothesis which has no observable consequence is excluded from science. In other words, if there is no way to test an idea or hypothesis, then it cannot be a part of empirical science, for there is no possible relevant research. To put the point in Ginev's language, there would be no empirical practice to relate to such a theoretical object. Hence, theoretical objects with no testable consequences are excluded from empirical science. A second, related point is that it is not sufficient for a hypothesis to have empirical consequences, but these consequences must be confirmed in scientific research. Those whose consequences are not confirmed by observation are discarded (Cf. Lonergan, 95–96).

The above two observations about theoretical objects illustrate the contextual nature of all theory. A theoretical object does not appear without prior conditions. There must be some event or thing, and a person who is alert enough to note, to identify, to attend to an aspect of familiar experience which she has not yet understood, *wonder* as Aristotle called it. So two conditions must be met for research to occur: without the experience or a thing there would be nothing to inquire about; and without the person being intellectually aware, being curious, the experienced would simply remain a familiar object, something ready-to-hand.

One might conclude from the reference to experience that practice is prior to theory, but this would be a mistake. Some kind of experience is prior, for without this there would be no occasion to begin to puzzle, to wonder, and it is wonder that is the genesis of the process of inquiry. And when we

wonder we naturally seek and try to discover, to grasp a possible correlation among the elements in the experience. And we follow up that possibility by formulating what we have discovered. Discovery leads to the formulation of hypotheses which are composed of theoretical objects.

What is the goal of inquiry? One who inquires seeks to understand “something as something,” to grasp the already familiar in a new way. Or one might say, the goal is to give an alternative account of the thing that is already familiar. Thus a physicist gives an account of light not in terms of color but of wave length, etc. But to give an account one must articulate one’s grasp of some possibly relevant correlation. And so it is that a hypothesis and theoretical objects generally are a response to inquiry. A hypothesis is generally the identification of some correlation that has the potential to be relevant or significant—significance and relevance being understood in relation to the question that has been raised.

This aspect of the matter needs some elaboration. The significant is what is relevant, as opposed to what is incidental. And it should be added that significance is determined by the question that has been asked. For in any situation, there are multiple questions which might be asked, and depending on the question different aspects of the experienced object are relevant. To borrow an example from ordinary experience, by virtue of their habits and interests a logger and an ornithologist walking into a forest will observe very different things and so inquire very differently into what is present in the environment. Each will observe some elements and equally will ignore others.

If it is true that a hypothesis is formulated only in the context of experience, the fact is that formation of a hypothesis (theoretical objects) is just one stage of the cognitional process. What a scientific researcher seeks is to determine whether the hypothesis can be applied to all similar situations. This is what we mean by verification. It is assumed that the particularities of a situation, place and time for example, can be ignored. So, for example, whether I run a given test in Bowling Green or in New York is regarded as incidental, as irrelevant. Equally, whether I run the test or someone else is also incidental, so long as both of us follow appropriate procedures. What each scientific researcher is seeking is to describe the significant differences. And what constitutes a significant difference is determined by one’s hypothesis.

Another element of theoretical objects as they are found in hypotheses must be highlighted. They are provisional. When one speaks only of “theoretical objects” this aspect is obscured, but the very term “hypothesis” indicates that its content is to be tested, that it is a provisional formulation needing to be confirmed by appeal to experience. Note that there is a double relationship. It has already been said that without experience, there would be no inquiry, and so prior to the formulation of a hypothesis some experience is required, and this experience rouses one to seek to understand. But now it must be added that formulating a hypothesis is also not enough. Reflection follows. A hypothesis is the formulation of an insight; it is the grasp of some possible explanation. Reflection by contrast asks: “Is this what is going on?” – *this* referring to the content of the hypothesis. And how is this question answered? By a return to the data, by checking whether the hypothesis accounts for the data, or whether there remain relevant aspects unaccounted for. If there is a remainder, one revises. Only when all relevant aspects of the data have been accounted for does one affirm the hypothesis. Theoretical objects are initially hypotheses that, once formulated, require confirmation which is accomplished by a return to the data.

Even this way of describing the provisional character of theoretical objects is not sufficient, for the process of checking whether one’s hypothesis is adequate is repetitive and progressive. No sooner has a researcher confirmed a correlation in a study, than she is likely, given the opportunity, to test the same hypothesis in a slightly different situation, varying the object or the procedure in some manner. Thus a method successful in one area may be extended to another, and even eliminate a long familiar approach to a problem, as Ginev illustrates from the study of the phenomenon of florescence (2009, 378–380). In sum, a hypothesis may be adequate in a particular context, but the larger field in which it stands may come to be questioned, and even discarded.

Enough has been said, perhaps, to set forth the implications of this discussion for the discussion concerning the status of theoretical objects. (It seems more natural to speak of hypotheses, explanations, or correlations, but since Ginev formulates the problem in terms of theoretical objects, I will use this language here. Since hypotheses and explanations are combinations of theoretical objects, the relevant points can be made using either formulation.) A first

point to be made is that theoretical entities as they have been described are not *essences* in the sense that Ginev rejects—“something independent of the dynamics of practices of normal scientific research” (2009, 382). As noted they arise in the context of inquiry, are a result questioning. They are a product of a person thinking about something; they are experienced as a discovery, even it is recognized as a provisional discovery which will be open to revision or even reversal.

The last point needs more elaboration. It is recognized in many, if not most, cases that a hypothesis, even when confirmed, is provisional. Clarification may be needed; more precision in measurement required; discovery of an unexpected complication may require reformulating what constitutes the relevant factors, and in consequence a revision in one's understanding of what dimensions of the object are relevant or irrelevant. Because of these kinds of issues, a field of inquiry develops and expands. Later researchers build on the work of earlier researchers, and so gradually a body of knowledge results.

The mention of cooperation among researches raises a new issue. Two points need to be made with regard to this development. Development results from collaboration and yet is advanced by individuals. The possibility for these two dimensions must be noted. Every hypothesis is an identification, or better, specification of some set of conditions. Verification of a hypothesis is a confirmation that the specified conditions are actually found in experience. Both formulation and verification are activities carried out by researchers; they are products of the development of understanding in individual persons – a mode of Dasein's being in the world. How is it then that what is discovered is not a private possession? In so far as a hypothesis is a formulation of a certain way of understanding a situation, it is a specification of criteria for its being affirmed. Both the criteria and the conditions are open to others. The criteria are grasped by anyone who understands the hypothesis, for to understand a hypothesis or correlation consists precisely in grasping its empirical conditions. Secondly, for anyone with competence in the field, anyone familiar with the relevant practices, the conditions are available for inspection. Hence there is the possibility of grasping to what extent the predicted conditions actually pertain. While verification is a judgment which is a personal achievement accomplished by each and every researcher, the result of such verification is open to

every other person who grasps the meaning of the hypothesis and has occasion to examine the relevant experimental evidence.

Implicit in the above account is an anti-essentialist account of theoretical entities. There are a number of features of this account which are anti-essentialist. First, according to this account theoretical objects are the product of inquiry. They are the result of a researcher responding to a particular object or event by grasping some correlation that appears significant and then formulating what is significant or relevant. So it is the product of a “thinking out,” an expression by a researcher about what is important or significant in an experience, or body of data, and by implication what can be ignored, because it is incidental to the inquiry at hand. Typically, as was noted, one thing which is incidental is the “here and now” character of each experimental object. What one is interested in is not that some X occurred at some place or time but some difference in what occurred at the particular place and time. To put the point in another way, a physicist studying the oxygen atom or a chemist studying water is not concerned with the specific atoms or molecules selected for study, but only that the sample is free from impurities. The incidental character of time and place makes it possible to generalize from a small experimental base. In addition, it makes scientific collaboration possible, since within limits, time and place are irrelevant. This account is a description of what Ginev calls “meaning constitution.”

Theoretical objects are so significant, because once one has grasped a meaning, then every other situation which is the same in the relevant respects can be understood in the same way. No new insight and formulation is necessary, and after a few repetitions, what we have previously understood soon becomes obvious and familiar. Once this is the case, typically we are able to attend to new matters. To illustrate, having learned letters, we can attend to words, and having mastered words we can focus on sentences, etc. It is also the basis for what Ginev characterizes as the everydayness of scientific research. Yesterday's discovery becomes today's assumption.

Secondly, the provisional nature of theoretical objects has been noted. This point strikes directly against the essentialist conception of theoretical objects. If theoretical objects are a product of a person “thinking out” in response to experience, then they are also merely a possibility, a thought which is being entertained by someone. The key aspect is that

inquiry does not stop here. It is not enough to come up with a theoretical object, the whole point of formulating a hypothesis is to be able to test it. Testing or verification is a response to a different requirement of mind. Every idea or theoretical object or hypothesis must be confirmed. If not confirmed, it is only a possibility that may turn out to be “a bright idea,” speculation, a fiction, etc.

One might say that the first stage of scientific inquiry results in the formulation of a theoretical object or hypothesis, an answer to the question *what? why? or how?* that can be tested. Answering this question is not the end of inquiry, but leads directly to a different concern, the critical question, *Is it so?* It here refers to one’s formulation, the content of one’s hypothesis. Verification is one name for this second question and resulting process. For it is a process, another kind of “thinking out.” If the first result of inquiring into experience is discovery of some correlation which is fixed by means of formulating a hypothesis, then the result of having formulated a hypothesis is that a new question arises: Is the proposed understanding, the hypothesis, correct? From trying to understand one moves to determining whether one’s understanding is correct. As naturally as experience gives rise to inquiry, so in inquiring we shift from trying to understand – *What is it?* – to answering the question, *Is it so?* For inquiring is a complex process, where we are not satisfied with acquiring some understanding but we also want to know whether our understanding is correct.

How is this new question answered? Either by *yes*, or *no*, or by *perhaps*, *possibly*, *probably*, and the like. We have a large number of ways in which we indicate that no definitive answer is possible. What is going on in verification? To name the process is not enough, especially since so much puzzlement results from not being clear on this element of knowing. How do we answer the question, *Is it so?* In other words, when is it permissible to affirm a hypothesis? Here it is relevant to begin by noting that a hypothesis arises as a result of some grasp, some insight, into a particular set of conditions. Hypotheses have their origin in experience and in an inquiring mind. A hypothesis is the formulation of what is significant in the experience, of some relevant correlation in it, etc. Now, having formulated what is relevant, we turn to checking, by returning to the data to determine whether it is really so, whether the specified conditions are present in experience. (There is, of course, also the question whether the hypothesis has been formulated correctly, that is

consistency in terminology, etc. In other words, logical concerns must also be met, but I am not going to elaborate on this aspect here.)

A hypothesis is a formulation of a set of conditions. As already noted above, a hypothesis can be part of empirical science only if the conditions specified can be detected in some kind of experimental setting. (The critical phase in knowing is equally apparent in everyday living, as when we question the claims of others: “You said such and such but are you sure it is so?”)

Verification, then, consists of raising the critical question, *Is it so?* But what is the basis for an answer? Recognizing that every hypothesis is a statement of conditions supplies the clue to an answer. A hypothesis is a conditioned; it can be affirmed only if its conditions are fulfilled. And so it is that after having formulated our question, we answer the critical issue by returning to the data on which our hypothesis was based. Formulate a hypothesis about water and one will return to water to determine whether the specified conditions are fulfilled. How, then, are we to understand the way in which the critical question, *Is it so?*, is answered? An initial observation is that we affirm and deny or express some modality of probability only after we have reflected. To reflect is to survey the data with regard to whether it reveals the conditions which are specified in the hypothesis which has been formulated. Negatively, reflection is not a new attempt at understanding, but rather a movement of mind in which one asks whether the conditions which have been specified are manifested in the relevant data.

At one level this answer is correct, but at another level it is so incomplete that it is likely to be misunderstood. A preliminary clarification is found by observing the actions of a researcher. After coming to a conclusion that some specified conditions have been observed and all ambiguity removed, there is no further point to repeating the operation and to do so is even considered a sign of stupidity. Thus well-established findings in a field need not be repeated. Rather having satisfied ourselves on a particular point, we turn to a new issue. And so having discovered that salt can be analyzed into chemical elements, one might turn to apply a similar technique to another crystalline substance, etc. So it is that Galileo’s measurements of acceleration on an inclined plane could be extended to freely falling bodies, etc. And so after verifying a hypothesis in one instance, one may turn to replicate the results in a new situation or apply similar techniques to other

materials, etc. And so it is that individual judgments that flow from answering the critical question are not just individual occurrences, but stand in complex relationships to one another constituting what we call fields of knowledge.

A more satisfactory account must explore some of the complexities flowing from various possible answers. Two possibilities exist – that the data conforms to expectations or that it does not. The second case is the easier one: if the conditions specified by the hypothesis are not found in the data, then the hypothesis is discarded. In the first case the response is more complex. In the simplest case a hypothesis relates to a limited body of data which can be inspected exhaustively, and then a conclusive answer can be given. Ask “Are you in your office?” and the answer requires only that one be aware of where one is. Admittedly, doubts could be raised about whether one is deluded, etc., but note that this would result from raising other questions and not really be an answer to the question in the context in which it was asked.

There is, however, a more complex case that is typical of an affirmative answer to the critical question – that only a part of all possible relevant data has been examined. Then, the affirmative answer brings one sequence in knowing to a conclusion, but inasmuch as additional data is available, the process can be repeated, indeed almost begs for new inquiry to be undertaken. And so it is that each individual judgment or verification stands in the context of others. The fact that each individual judgment stands in the context of many other judgments has important implications, a few of which need to be mentioned here. In each field of knowledge the relationships among judgments differs, and so here I will note only a couple of characteristics as found in the empirical sciences.

In the empirical sciences the answer to one question assumes the answer to a multitude of previous questions. So complex previous ways of understanding a particular phenomenon are assumed and it is only to the extent that such understanding is assumed to be correct that one can go on to make a new affirmation in the present context. For example, to talk about wave length, one needs to assume a theory and practice of measuring. A conclusion, then, may be affirmed as long as the assumed system of measurement is accepted, but in fact systems of measurement are subject to revision. New technology may allow more precision or on the theoretical side a new theory may require correcting for what

was before thought to be incidental. Enough has been said, perhaps, to make the point that an affirmative judgment with regard to a hypothesis may be regarded as merely probable, because in fact the hypothesis being considered stands in the context of a much larger set of conditions. So it is that even what is verified may be regarded as merely probable insofar as it is dependent on techniques and theories that are open to revision.

Prof. Ginev has argued for the immanent transcendence of theoretical objects. I have preferred to frame the discussion in terms of hypotheses, but since hypotheses are made up of theoretical objects, what applies to hypothesis is applies to theoretical objects. In the above analysis I have tried to elaborate on “the immanent transcendence” of theoretical objects, for a theoretical object is a single content which has the potential to be applied to an unlimited number of instances. That potential range is often characterized as a *horizon*, or in classical language a *universal*, a single content which has the potential to be applied to an indefinite number of situations of a specified kind. Something more needs to be said with regard to how this account avoids falling into essentialism, but this is best treated in a separate section.

IV Beyond Essentialism

In the previous section I have given an alternative account of the “immanent transcendence” of theoretical objects, focusing on locating theoretical objects in the context of inquiry rather than in terms of practices. The implications of this shift have been only partially examined. Also, additional comment is needed to clarify some of the assumptions in this alternative account. Contrasting these assumptions with those embedded in essentialism will also aid in clarifying how this account differs from Ginev’s account where he does not break completely with essentialism.

First, theory has been set in the context of inquiry rather than of practices, as Ginev prefers. Without doubt there is a close relationship between theoretical objects and practices. Ginev is right to note the “changing configurations of scientific practices” (2006, pp. 110–123). Practices gain their significance in relation to one’s theoretical framework, and so their status depends on the theory which they exemplify. The co-dependence, as it is described, is certainly the case. But it is an asymmetrical relationship. The theory gives significance to the data, but the data supplies the conditions so that the theory

may be affirmed. In this regard there is a kind of priority which accrues to theory, for theory specifies what becomes relevant and it is in relation to theory that the data of experience provide confirmation or disconfirmation, so that what was entertained as a hypothesis is either affirmed or denied.

There is another role for experience, but it is prior to theory. Experience is a source of meaning. It is the material on which intelligence works or with which it works both so that questions arise and as that which is examined when one is questioning. Understanding is not a free creation, but rather theoretical entities or ideas are a response to the materials supplied in experience. Since experience is variegated and variously significant in different respects, different ranges of experience are relevant for different theories. (The opposite situation where idea is prior and instantiation of the idea follows is found in the work of an artist, who works to bring what was only a sketch or suggestion into existence.)

This role of experience as source of meaning precedes and complements the other, and reveals that theory is both a response to experience and confirmed by experience—a double relationship exists. This fact supports the view that inquiry is a process, an ordered process, in which each of the parts must occur in the proper order. Without experience, the presence of data, there is nothing to understand; and experience alone is without understanding, like Aristotle's man of experience who may act effectively, but is unable to explain. Similarly, understanding by itself is not enough, for by itself it is merely a possibility, a possible correlation. What is desired is not just an idea, but the confirmation that what one has conceived is adequate to experience. So understanding is naturally followed by reflecting and judging. Finally, as already noted, as human beings we attend to one thing at a time, and every judgment is a limited account of all that can be known, and so our single judgments stand with others both before and after and so coalesce into fields of inquiry.

To focus on inquiry rather than practices in an account of theoretical objects is significant because it places them in a larger context, in the full sweep of our experience of knowing. It opens the door to a fuller exploration of the dynamic of our quest to understand.

Another way to get at the differences between the above account of inquiry and cognitive existentialism is to observe that Prof. Ginev is developing his philosophy of science in context of the program which Heidegger outlined in *Being and Time*. In this

conception the *ready-to-hand* is objectified in the *present-at-hand*: through the process of interpretation meaning is constituted. For Heidegger there are three moments in this process. Ginev describes them in this way: there is "meaning we have in advance (a fore-having of possibilities), meaning we see in advance (a fore-sight of possibilities), and meaning we grasp in advance (a fore-conception of possibilities)" (Ginev 2009, 381). Each of these requires clarification.

"Interpretation," writes Heidegger, "is grounded in *something we have in advance*—in a *fore-having*" (B&T 191). In elaboration Heidegger states that "the interpretation operates in Being towards a totality of involvements which is already understood" (*ibid.*). *Fore-having* appears to be an account of the ordinary, everyday world that is familiar to us, the lived world, the world of common sense, however one wishes to identify it. The point is that there is given in experience that which can become a source of meaning; the empirical is something which potentially can be understood. Since it is what precedes interpretation, it provides the materials about which an inquirer can come to question. It is another way of identifying experience as a source of meaning.

Just as the response to inquiry is the formulation of some hypothesis (theoretical objects), so "interpretation is said to be grounded in *something we see in advance*—in a *fore-sight*" (B&T 191). According to Heidegger, *fore-sight* "takes the first cut" out of what has been taken into our fore-having, and does so with a view to a definite way in which this can be interpreted (*ibid.*). What Heidegger seems to be describing here is the fact that when we inquire, we formulate our discoveries – that "towards which we set our sights 'fore-sightedly', becomes conceptualizable" (191). Again there are notable similarities between Heidegger's account and one focused on inquiry. All inquiry is, as I have noted, in terms of a particular question and so can be said to be "with a view to a definite way." In addition, formulation is an identification of what is relevant, significant, or essential to the insight which has been gained; this is what is "conceptualizable." However, if some aspects of experience are relevant, it is also the case that others are irrelevant, at least for the moment, in relation to the question which is being asked. In this way inquiry also "takes a first cut" out of what is present in the *fore-having*.

In addition, this meaning is rightly said to be "something we see in advance," for every theoretical object is an articulation of a content which is poten-

tially found in an indefinitely large number, if not infinite number, of situations. The point is that once one has made an interpretation in one context – experimental setting, in the case of scientific research – the same understanding has the potential to be employed in other situations similar in the relevant ways. So it is that theoretical objects can be described as something “seen in advance.” More precisely, their openness to repeated employment is cast into language which describes the range of possible instantiations as a horizon. The visual metaphor implicit in this account is satisfactory if it is understood that what is being described is the fact that a single understanding, one theoretical object, has the potential to be employed in an indefinite range of instances. In other words, it is, as found in the mind, a universal.

Finally, fore-conception is said to be “*something we grasp in advance*” (191). In clarification of this dimension of meaning constitution, Heidegger states that “the way in which the entity we are interpreting is to be conceived can be drawn from the entity itself, or the interpretation can force the entity into concepts to which it is opposed in its manner of Being” (191). Here, Heidegger’s account of the constitution of meaning diverges significantly from the account of inquiry given above. No doubt Heidegger is right to observe that interpretation can be drawn from the entity itself or it can force an entity into concepts that are opposed to its being, but what the reader wants to know is this: how do I determine which one is occurring in each particular situation? Am I giving an account of what is present in fore-having or am I misconstruing its nature? Heidegger is raising the critical question. This is clear from the fact that he speaks of the interpretation being decided “either with finality or with reservations” – with certainty or merely some modality of probability. On what basis are interpretations decided with finality or with reservations? Nothing is said at this point. What is lacking is any reference to reflective understanding and its product, judgment.

Here lies the most significant difference between Heidegger and the account of inquiry sketched above. Without an account of the critical dimension of understanding one raises the issue of the hermeneutic circle and the issue appears insoluble. Here it is not possible to do justice to this complex issue, but an elaboration of the implications of the above account of inquiry can indicate where the solution lies. How do we know when we have arrived at an interpretation which is “drawn from the

entity itself” and is not “forcing an entity into concepts opposed to its being?” The key is to realize the progressive nature of the process of learning. There is no doubt that my current understanding stands in relation to other concepts and supporting evidence, such that the part gains its meaning in the context of the whole and the whole gains its meaning from the parts. This mutual dependence or circularity, however, is not that of a closed or vicious circle. The reason is that individual judgments stand in the context of other judgments based on related aspects of experience. Having examined one area of experience, the intellectually aware researcher will naturally seek further evidence from other related ranges of experience. So long as the theory being employed is adequate to explain the new ranges of data, no revision is required; however, if some aspect of the data cannot be explained using the old theoretical framework, then a new account will be necessary. So it is that theoretical objects are progressively redefined even in the course of normal science, and a major shift in one’s scientific theory occurs when a new way of organizing the data in a field is the only way to account for all the data. Again, think of Ginev’s account of the history of the study of fluorescence serves as an example of the latter phenomenon. In other words, the process of learning involves successive judgments, each of which stands in the context of others. In the case of empirical science all judgments remain provisional, because there will always be the possibility of additional data or new ways of grasping the data of experience. (For more details, see Lonergan’s analysis of probable judgments, *Insight*, 324–329).

Another implication of the account of reflective understanding and judgment relates to the gap that Ginev identifies between the ontical and the ontological in Heidegger, roughly the results of specialized inquiry as opposed to being itself. According to the account of inquiry given above, scientific research proceeds to answer the question, *Is it so?* An affirmative answer, *yes*, is an affirmation of being, not merely some entity; or if one prefers, the theoretical objects, things, or entities that are affirmed in science are a part or aspect of being. In so far as a scientific question is only one of a number of ways in which we can question our experience, the answer is limited to an expression of one dimension of being. Other questions asked in different ways with different criteria abound. One only need note our common, everyday way of dealing with particular things for a relevant example. And so it is that sci-

ence is only one way of grasping what is, for other questions with different criteria are possible. Our desire to know, our capacity for inquiry, is not limited to scientific research; rather scientific research – admittedly an enormously influential question in modern and contemporary times – stands in the context of the many questions that we human beings struggle with both individually and collectively. Indeed, all science ultimately has its source in everyday experiences and its discoveries result in applications which equally find their place in the everyday world of common sense.

As noted in the beginning, Ginev's account of science is both subtle and detailed. The primary way in which the account of inquiry which has been outlined above differs from his view is in sketching the complexity of human knowing, that we proceed from asking what something is to reflecting on what we think we have discovered to determining whether *it is so*. As experience leads to discovery and is followed by the formulation of understanding, so understanding leads to asking whether our understanding is correct. Recognition that every hypothesis is a formulation of conditions, and every judgment an affirmation that the conditions specified in the hypothesis are present in experience, clarifies the respective roles of theory and data. To be a part of science, theoretical objects (terms) must have empirical consequences; determining whether these consequences are actually present in experience is the task of reflection, the critical question. For every hypothesis is a formulation of conditions, and unless those conditions are found in experience, the hypothesis cannot be affirmed. For Ginev the fore-structure of interpretation and the explicit structure of science are "mediated by interrelated practices" (2006, pp. 135–144). While this account includes a reference to both theory and practice, it fails to articulate the dynamic clearly. The contextual nature of theoretical objects is reflected in this account, but their provisional character is not recognized. The provisional nature of theoretical entities becomes clear only when one recognizes that beyond understanding, beyond grasping *what is*, there lies the further question, *Is it so?* Without this clarification, there is the tendency to regard theoretical objects as essences. With this clarification both their generality and their provisional status has been described. And so the tendency to essentialism has been accounted for and corrected.

In addition, when the role of reflection and judgment are noted, then the problem of the hermeneutic circle is replaced by the process of learning rooted in our desire to know all that beckons in experience. Experience rouses inquiry, and inquiry seeks understanding, and provisional understanding seeks confirmation, grounding of the understanding. And far from ending there, once satisfied on one point, we turn to inquire about a related issue or new data in experience which has the potential to call our hypotheses into question and so trigger the quest for a more adequate understanding. And so it is not appropriate to think of inquiry as a circle moving from experience to understanding and back to experience, but rather as an ever expanding quest for a better understanding grounded in ever greater ranges of data. In this framework essentialism is no longer a concern, for the provisional nature of all theoretical objects is clearly recognized and the generality of theoretical remains. The immanence and transcendence of scientific thought are both recognized and accounted for.

References

- Ginev, Dimitri (2006) *The Context of Constitution. Beyond the Edge of Justification*, (Boston Studies in the Philosophy of Science), Springer.
- Ginev, Dimitri (2008) "Cognitive Existentialism", *Iyyun (The Jerusalem Philosophical Quarterly)*, July 2008, 227–242.
- Ginev, Dimitri (2009) "From Existential Conception of Science to Hermeneutic Phenomenology of Scientific Research." *Journal of Philosophical Research*, Vol. 34: 365–389.
- Ginev, Dimitri (2009a) "Perspectives on Reality and 'The World' in Scientific Realism Debates", *Human Affairs*, 12, No. 2.
- Heidegger, Martin (1962) *Being and Time*. Tr. by John Macquarrie and Edward Robinson. New York: Harper & Row.
- Lonergan, Bernard (1957, 1992) *Insight*. Toronto: University of Toronto Press, 1992.
- Plato, *Meno* in *Five Dialogues*. Tr. by G.M.A. Grube; revised by John M. Cooper. Indianapolis, IN, 2002.