Nature’s Suit

Husserl’s Phenomenological Philosophy of the Physical Sciences

LEE HARDY
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In an article titled “Husserl’s Phenomenology and Scientific Realism” Joseph Rouse notes that “those philosophers of science at all familiar with Husserl tend to associate him with views akin to instrumentalism, which has been largely discredited today; he is therefore thought to be of historical interest at best.”¹ It is not difficult to find evidence in support of this statement. In his comments on a paper by John Compton, for instance, Ernan McMullin refers to Husserl’s orientation in the philosophy of science as “broadly instrumentalist.”² This orientation was due, McMullin surmises, to the fact that “Husserl shared the generally positivist understanding of natural science in the middle Europe of his day.”³ Gary G. Gutting, in his article titled “Husserl and Scientific Realism,” holds that Husserl’s position on science in the Galileo analysis of the Crisis is “anti-realist.” Furthermore, he takes Husserl’s antirealism to be based upon certain theses about the nature of empirical science often associated with positivism.⁴ In his article “Husserl’s Later Philosophy of Natural Science” Patrick A. Heelan also claims that Husserl was an antirealist with respect to scientific theories.⁵ In his contribution to The Cambridge Companion to Husserl, Herman Philipse takes it that Husserl’s philosophy of science, following Bishop Berkeley and Ernst Mach, was clearly instrumentalist.⁶

1. HUSSERL: REALIST OR INSTRUMENTALIST?

Indeed, there seems to be a consensus in the secondary literature that Husserl’s understanding of science was deeply indebted to the positivism of his day and thus inclined toward an instrumentalist interpretation of scientific theories. “Husserl’s approach to the sciences of nature,” remarks Aurelio Rizzacasa, “with its idea of the objectivity of principles and its insistence
on induction and verification, is very close to positivism in spite of the fact that he has rejected its philosophical consequences.”7 In his comparison of Husserl’s and Heidegger’s philosophies of science, Theodore J. Kisiel claims that “the favorite theses of logical positivism in its nadir of instrumentalism and operationalism still seem to lurk behind Husserl’s formulations of his own phenomenological positivism: the empty language of mathematics is applied to the invariant mass of the lifeworld merely in order to acquire a measure of predictive control over it. Physical theories are thus reduced to merely an abstract interlude and useful complication in our practical concerns, and therefore can be suppressed at any time without the loss of any real knowledge.”8

Such interpretations of Husserl’s philosophy of science are not without foundation in the Husserlian corpus. One of the major theses of the positivist philosophy of science is that scientific theories do not aim at giving us a literally true account of the unobservable deep structure of nature, but rather sophisticated symbolic machinery for generating useful predictions about observable phenomena within nature. It would seem that Husserl agrees. In the “Prolegomena” to the *Logical Investigations*, he claims that those involved in the empirical sciences are “more concerned with practical results and mastery than with essential insight” (*LI*, 245 / *HXVIII*, B 253). In *Ideas I* he points out that the utility of physics consists in the fact that “any cognition in physics serves as an index to the course of possible experiences with the things pertaining to the senses and their occurrences found in those experiences. It serves, therefore, to orient us in the world of current experience in which we all live and act” (*ID I*, 85 / *HIII* 1, 83; translation modified). In the laws of the physical sciences, “the functional co-variation of empirical phenomena are generalized and fixed with exact, mathematical precision. . . . Thus one can outline the empirical regularities of the practical life-world which are to be expected. In other words, if one has the formula [i.e., the law], one already possesses, in advance, the practically desired prediction of what is to be expected with empirical certainty in the intuitively given world of concretely actual life, in which mathematics is merely a special praxis” (*C*, 43 / *HVI*, 43).

Furthermore, in the *Crisis*, Husserl claims that the objective correlates of the mathematical laws of the physical sciences do not really exist. For the proper objects of such laws are idealized, mathematical objects, not real physical things. The “essential principle” behind Galilean physics, indeed, behind modern mathematical physics in general, is that nature is, in itself, mathematical (*C*, 53 / *HVI*, 53). In the science of Galileo, we can already
detect, Husserl claims, the “surreptitious substitution of the mathematically substructed world of idealities for the only real world, the one that is actually given through perception, that is ever experienced and experienceable—our everyday life-world” (C, 48–49 / H VI, 48–49). Here, however, the practitioners of modern science have been “misled into taking these formulae and their formula meaning for the true being of nature itself” (C, 43–44 / H VI, 43). In this way nature as it appears to us in sensuous intuition gets demoted to the status of “mere appearance,” while nature as it is projected in the physical sciences is dignified by such honorific titles as “objective world,” “true being,” and “nature in itself” (C, 29 / H VI, 27). They fail to realize that the “objective” world is a mere ideal construct, developed for the sake of making exact laws possible. Mathematics and mathematical science, as a garb of ideas . . . encompasses everything which, for scientists and the educated generally, represents the life-world, dresses it up as “objectively actual and true” nature. It is through the garb of ideas that we take for true being what is actually a method—a method which is designed for the purpose of progressively improving, in infinitum, through “scientific” predictions the rough predictions which are the only ones originally possible within the sphere of what is actually experienced and experienceable in the life-world. (C, 51–52 / H VI, 52)

The phenomenological critique of modern mathematical physics, then, is to expose the objective physical world for the construct it is by recourse to the mental processes of abstraction and idealization by which it was constituted. “What Husserl criticized about science,” Heelan points out, “was not that it used mathematical models but that, (generally) led by a false metaphysics, it (generally) mistook them for reality.”9

In light of the above, there would seem to be at least strong prima facie evidence for the position that Husserl’s philosophy of science is committed to some form of instrumentalism. Husserl characterizes the laws of the physical sciences as nothing more than sophisticated instruments of prediction; and he claims that the proper objects of the laws of those sciences enjoy, at best, an ideal, mathematical existence, not a real, physical existence. In some important sense the physical sciences do not describe the real world.

Nonetheless, there are a number of Husserl interpreters who would claim that Husserl’s phenomenology is consistent with a realistic construal of the
physical sciences. Francis J. Zucker states that the phenomenological method takes a “basically realist stance” on science and thus rejects all forms of instrumentalism.\textsuperscript{10} Joseph Rouse maintains that Husserl “would not use his account of idealization as an argument for anti-realism about theoretical entities.”\textsuperscript{11} Furthermore, Husserl’s phenomenology on the whole is “consistent” with the implicit realism of the practicing physical scientist.\textsuperscript{12} In line with these views, Gail Soffer claims that “a consistent development of Husserl’s thought does not lead to instrumentalism, but to an epistemically sophisticated version of realism.”\textsuperscript{13}

A middle position has been developed by Charles W. Harvey. He admits that “there is a definite strain in his [Husserl’s] thinking toward an instrumentalistic position in the philosophy of science.”\textsuperscript{14} But, he claims, Husserl’s instrumentalism is “moderate” and only “provisional.”\textsuperscript{15} This is because Husserl denies real physical existence only to those entities that are imperceptible in principle. But many of the entities that now pass for theoretical entities because they are currently imperceptible may become perceptible in the future with the technological advance of scientific instrumentation. They are imperceptible only in fact, not in principle. In section 52 of Ideas I, it appears that Husserl classifies such theoretical entities as atoms and ions among those things that are imperceptible in principle. Here, however, Husserl “was victim to the historical contingencies surrounding the vision of egos.”\textsuperscript{16} With the invention of the cloud chamber, it is now possible to perceive ions, Harvey claims. Thus what was formerly posited as a theoretical entity is no longer such. Many of the entities posited as theoretical at one point in time may at some later point in time become perceptible by means of the appropriate instruments. Since Husserl allows for the real physical existence of entities that may at this point be imperceptible—but are not in principle imperceptible—his instrumentalism is only provisional.

Clearly the question of Husserl’s instrumentalism remains largely unsettled in the secondary literature. There is little agreement on the question of whether Husserl’s philosophy of science is committed to instrumentalism or realism, or in what sense it is committed to instrumentalism or realism. In addition to providing a general orientation to Husserl’s philosophy of science, the chief aim of this study is to make a contribution to the resolution of this issue by taking up in depth the problem of theoretical existence in Husserl’s philosophy of the physical sciences. My primary thesis will be that Husserl was indeed an instrumentalist, but that his instrumentalism is restricted to an interpretation of scientific laws, not theories. His phenomenology is in fact consistent with a realistic construal of scientific theories.
2. LAWS AND THEORIES

In his introductory essay to *The Structure of Scientific Theories*, Frederick Suppe claims that within the philosophy of science, the problem of the “nature and structure of scientific theories” has preeminence, since “theories are the vehicle of scientific knowledge.”17 “It is only a slight exaggeration,” he continues, “to claim that a philosophy of science is little more than an analysis of theories and their roles in the scientific enterprise.”18 The overriding concern within the Anglo-American secondary literature on Husserl’s philosophy of science about the question of Husserl’s instrumentalism reflects Suppe’s conviction that the theory of scientific theory is central to the philosophy of science. Thus the question of whether Husserl’s philosophy of science is committed to a realist or an instrumentalist interpretation of scientific theories is quite understandably the first question that will be addressed to Husserl within anglophone circles. My intention in this study to give an answer to this question that is both intelligible within the contemporary Anglo-American discussion of science and faithful to Husserl’s phenomenological approach to science.

Because my thesis hangs upon the distinction between laws and theories, it would be prudent at the outset to indicate in a rough and preliminary way what I have in mind by this distinction. Scientific laws specify the functional interdependence of quantified physical variables. As such, their intent is to capture lawlike regularities in the behavior of empirical phenomena.19 Galileo’s law of free-falling bodies, which determines the velocity of free-falling bodies as a function of lapse time, and Boyle’s law, which specifies the pressure of a gas as a function of temperature and volume, are examples of such laws. They state how empirical objects behave. Free-falling bodies accelerate at a rate proportional to the square of the elapsed time of their fall; the pressure of a gas within a given container is inversely proportional to the volume of that container. But laws do not explain why empirical objects behave the way they in fact do. Scientific theories are developed and proposed in order to provide just such an explanation. Typically, theories explain by postulating unobservable entities that causally interact in such a way as to produce the regular behavior of empirical objects captured in scientific laws. For the law of free-falling bodies there is the theory of gravitational force; for the gas laws there is kinetic theory. As Bas C. van Fraassen characterizes the “generally accepted” account of theories, “theories account for the phenomena (which means, the observable processes and structures) by postulating other
processes and structures not directly accessible to observation.” Others agree. The causal interaction of the entities postulated by the theory, writes Richard N. Boyd, are to “explain the predicted regularities in the behavior of observable phenomena.” Peter Kosso counts as a theory “any description of the unexperienced world that is part of what accounts for and helps us understand the experienced world.” Stathis Psillos, in his defense of scientific realism, states that theories “explain and predict observable phenomena by reference to unobserved phenomena.” This is the received view of the nature and role of scientific theories.

Realist and instrumentalist interpretations of scientific theories differ with respect to the semantic value they assign to theories and the ontological status they accord their corresponding objects. A realist account of scientific theories claims that scientific theories are intended to be true, and that theoretical terms are intended to refer to physical realities. Thus the evidence we have for the truth of a theory will at the same time move us to accept the existence of the entities as postulated by that theory. As Suppe puts it, scientific theories, if true, refer to “real but nonobservable physical entities or their attributes. For example, ‘electron jump’ as a term in VT [the theoretical vocabulary] refers to a behavioral characteristic of a nonobservable object, an electron, which really exists.”

On the other hand, an instrumentalist will claim that the acceptance of a theory for scientific purposes does not at the same time commit one to believing that the theory is true. A scientific theory is not the kind of thing that is true or false. It is nothing more than a rule for generating conditional statements, laws, or predictions about empirical phenomena. The virtue of a theory is not its truth, but its “empirical adequacy” (i.e., its track record in generating true statements about observable states of affairs). Theories, if accepted, will be accepted on the basis of their empirical adequacy, their simplicity, their comprehensiveness, and the like. But the acceptance of a theory, on the instrumentalist account, does not at the same time commit one to the belief that the theory itself is true, that its theoretical terms refer, or that the entities it postulates exist. Here scientific theories have no semantic punch.

The logical positivist philosophy of science generally holds to an instrumentalist account of scientific theories. Theories are nothing but “axiomatic calculi,” which can be provided with a partial interpretation in an observational vocabulary by way of correspondence rules. As purely syntactical machinery, they serve only to enrich the scope and predictive power of
those empirical generalizations known as scientific laws. The subsequent re-
action against logical positivism followed upon the stunning developments
in theoretical physics ever since the early twentieth century. It seemed that
the only plausible explanation of such developments would have to provide
scientific theories with a semantics of their own.

The distinction between laws and theories depends, accordingly, upon
a bi-level analysis of science. Laws state in the language of mathematics
the regular functional interdependencies between observable physical phe-
nomena; theories seek to explain why such regularities hold by postulating
unobservable entities and specifying their causal capacities. Laws make pre-
dictions possible; theories provide explanations. The realist-instrumentalist
dispute within contemporary Anglo-American philosophy of science is to a
large degree predicated upon the bi-level analysis of science. It is a dispute
over the nature of theories, not laws. The key question is how best to con-
strue the nature of theories, which go beyond what is observable in order
to explain it. The instrumentalist insists that science ultimately refers only
to that which is observable. Science does so in its laws, which are empiri-
cal generalizations over the behavior of observable phenomena. Theories are
merely instruments that enhance the unity and the reach of these empirical
generalizations. The realist holds that science refers not only to observable
phenomena and processes, but also, in its theories, to unobservable entities
and processes. The empirical adequacy of a theory provides grounds for be-
lieving that it is true and that the entities it postulates exist, not just that it is
useful in making empirical predictions.

My interpretation of Husserl trades on this generally accepted distinction
between scientific laws and scientific theories. I will claim that Husserl’s “in-
strumentalism” is in fact an interpretation of scientific laws, not theories. For
that reason Husserl’s phenomenological critique of science does not speak
directly to the contemporary debate within Anglo-American circles over the
nature of scientific theories. Much of the confusion surrounding the interpre-
tation of Husserl’s philosophy of science in the English secondary literature
is in large part due to the assumption that in the Crisis, Husserl is addressing
himself to the same set of issues that are being currently discussed by Anglo-
American philosophers of science. Due to this hermeneutical indiscretion,
the true import of Husserl’s claims about the nature of the physical sciences
are subjected to not a little distortion and, in some cases, rendered thoroughly
implausible. Part of the purpose of this study is to place Husserl’s phenom-
енological critique of science in its proper setting, and to demonstrate that,
understood within this setting, it is entirely compatible with the theoretical dimensions of contemporary science.

What I will argue, in effect, is that Husserl’s phenomenology is consistent with a realistic construal of scientific theories. I will not, by way of addition, argue as a biographical fact that Husserl himself was inclined, or would have been inclined, to give a realistic construal of scientific theories; nor will I claim that Husserl made a clear distinction between laws and theories; nor will I claim that Husserl developed or even projected a phenomenology of theoretical entities as such. My thesis is more modest, more strictly conceptual in nature, and more concerned with the contemporary prospects of Husserlian phenomenology within the philosophy of science than with certain biographical facts surrounding the person of Husserl. I will argue only that, given the distinction between scientific theories and laws, Husserl’s stated phenomenological critique of modern mathematical physics is entirely compatible with a realistic interpretation of scientific theories. In the conclusion to this study, I will briefly indicate what resources are to be found in Husserl’s thought for a phenomenology of theoretical entities.

3. THE PLAN OF THIS STUDY

Like Gaul, this study of the problem of theoretical existence in Husserl’s philosophy of science is divided into three parts. Part 1, consisting of the first two chapters, provides a general overview of Husserl’s phenomenological philosophy of science. The first chapter identifies and situates Husserl’s idea of the basic structure of scientific knowledge within the tradition of philosophical reflection on the nature of science. It then proceeds to indicate how this idea was “idealized” in Husserl’s later theory of evidence. The second chapter follows Husserl in his attempt to gain phenomenological access to the ultimate foundation of the sciences. Part 2 anticipates certain initial objections that might be made against the thesis that Husserl’s phenomenology is consistent with a realistic construal of scientific theories. The first objection is based upon a certain interpretation of Husserl’s theory of truth (chapter 3). If Husserl holds to an evidence theory of truth, and the existence of theoretical entities could never become evident in the required sense, then it could never be true that theoretical entities exist. The second objection is drawn from Husserl’s theory of rationality (chapter 4). If Husserl holds that we are justified in believing only that which is evident, and the existence of
theoretical entities could never become evident, then we could never be justified in believing that theoretical entities exist. The third part argues directly for the main thesis of the study. In chapter 5 I maintain that Husserl’s “instrumentalism” is restricted to an interpretation of scientific laws, not theories, and that the things he denies exist in any physical sense are not theoretical entities but rather idealized objects. The last chapter, chapter 6, takes up the question of the possibility of the real existence of things that are imperceptible. More general questions pertaining to the compatibility of Husserl’s phenomenology with any form of realism are also raised and discussed.

Such are the conceptual parameters of this study. But there are, in addition, two material limitations. First, this study is largely confined to a reading of and reaction to the Anglo-American secondary literature on Husserl’s philosophy of science spanning the last fifty years. Second, this study is primarily based upon an analysis and interpretation of Husserl’s major published works. The second material limitation is based upon the first. Given the general unavailability of Husserl’s unpublished research manuscripts, the discussion of Husserl’s philosophy of science in the secondary literature is based almost exclusively upon Husserl’s major published works, most of which are available in English editions. Hence the as yet untranslated works of Husserl will play a secondary role in the discussion; the unpublished manuscripts, a tertiary role—they will appear, in German, in the notes.
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