

FROM: *ENCYCLOPÉDIE PHILOSOPHIQUE UNIVERSELLE*

PATRICK HEELAN

Born in Dublin. Entered the Society of Jesus [Jesuit Order] in 1942. Awarded his Masters Degree in Mathematics by the National University of Ireland in 1948; [an Associate at the Institute for Advanced Studies, Dublin, 1948-]; received his Doctoral Degree in Geophysics from St. Louis University, Missouri, 1952; received his Doctoral Degree in Philosophy from the University of Louvain [Leuven] in 1964. He worked at the Palmer Laboratory at Princeton University with Eugene Wigner from [1960-1962]. He taught [theoretical physics] at University College, Dublin from 1964-1965, then taught [philosophy] at Fordham University in New York, and later at the State University of New York at Stony Brook where he [was] a Professor of Philosophy [till 1992; currently he is a Professor of Philosophy at Georgetown University, Washington, DC, USA]. At Stony Brook, he was Vice-President for Liberal Studies and Dean of the College of Arts and Sciences; [he was subsequently Executive Vice-President for the Main Campus at Georgetown University].

His works principally concern the philosophy of quantum physics as well as the structure of perceived space. The philosophical interpretation he gave for quantum mechanics led him to conceive of quantum logic (the non-classical behavior of propositions in quantum mechanics), not as an indication of incompleteness, but as resulting from the contextual character of the descriptive propositions that belong to quantum mechanics. Quantum logic for him is “the general logic of context-dependent discourse.”

— Jean Ladrière

QUANTUM MECHANICS AND OBJECTIVITY: A STUDY OF THE PHYSICAL PHILOSOPHY OF WERNER HEISENBERG (1966)

It has practically become commonplace to say that the development of quantum mechanics has brought into question numerous long established concepts of classical physics. In the present work, Patrick Heelan analyzes one of these fundamental concepts, namely, that of objectivity in light of Heisenberg's work. One of the first steps he advances is to critique the principle of complementarity: in the context of this

critique the author shows, among other things, that psychophysical parallelism is an insufficient explanation for scientific knowledge. Then he proceeds to critique the theory of measurement, as developed by Heisenberg. The author points out that the disturbance of a quantum system by the process of measuring has nothing whatsoever to do with any limitation on our access to physical reality. He also shows that the presence of the observer's subjectivity is the same in classical physics as it is in quantum physics. The nature of the quantum object, however, is different, in classical physics one has an "idealized and normative object," while in quantum physics the object is an "individual instance of an idealized norm." Based on the analysis of the logical structures of these physical theories, Heelan concludes that physics rests on the articulation of two worlds: a world-for-us, as described by observational and operational concepts, and a world-for-things, as described by explanatory concepts.

This book is the revised edition of Heelan's doctoral thesis, which was presented at the University of Louvain [Leuven] in 1964. At the end of the volume, the reader will find a useful lexicon of the scientific and philosophical terms employed.

— Marc Jager

SPACE-PERCEPTION AND THE PHILOSOPHY OF SCIENCE (1983)

The present work develops the principles of a systematic philosophical theory, one inspired by phenomenology and hermeneutics; indeed it employs them concretely to lay out a vast problematic extending from aesthetics and the philosophy of science to the *mind-body problem* and cultural theory. What motivates this project is the notion that cognitive processes are context-dependent. The method adapted for studying these processes is thus one which is capable of deciphering the *sense* of the objects of knowledge, at the same time it reinstates those objects within the horizons of experience (both interior and exterior) on the basis of which they were initially constituted. Such a method is that of phenomenological hermeneutics.

The author sums up what is essentially his main position in three points: 1) The task of hermeneutics is to go "to the things themselves." This task is governed by a set of elements which constitute the "fore-structure of understanding." It follows that the course of the hermeneutic project has a certain character of circularity to it, this is not as much a vicious circle, however, as a back and forth process which, while always incomplete, is, as it were, magnetized by "the thing itself," which is brought forth and made manifest to our experience. 2) It must be acknowledged that there is an ontological primacy to perception: "Reality is exactly what is or could be, manifested through perceptual essences and profiles, understood as horizons of the world." Furthermore, perception is essentially hermeneutic. It follows that the contents of perception never have a "unique, definitive, complete, final, absolute, a-historical, or a-cultural" character. 3) Within the contemporary debates in the philosophy of science, the author adopts a position that is neither that of "scientific realism" nor of "instrumentalism," but rather one of a "horizontal realism." Science clearly aims "to describe the elements and structures of reality." But the latter can often be "hidden to (theoretically and instrumentally) unassisted perception." Nonetheless, they do possess "authentic

perceptual essences that can be rendered directly manifest in perception with the help of theoretically structured instruments serving as 'readable technologies'." Scientific knowledge should thus be understood as an extension of "unassisted" perception. A perceptual fact has an outer horizon "which separates it from the ground on which it appears," and an inner horizon "composed of a multiplicity of possible perceptual profiles organized by an invariant essence." The perceiving subject can "bring forth a representative sample of the profiles in question," occasionally by making use of certain technological processes, which are themselves subject to interpretation in terms of theoretical representations. The theoretical entities described in these representations are not "simply detected thanks to an inferential operation, but rather, they are directly perceived." It follows from this that the correspondence between the "manifest image" and the "scientific image" is not done one-to-one, but by a "many-to-one or one-to-many application between contextually defined perceptual objects within contexts that are mutually incompatible but complementary." This should not, however, be understood as a form of conventionalism, nor as a form of "cultural relativism." Pre-comprehension, which guides interpretation imposes strict limits to the descriptive categories which can be used and to the manner in which they can be linked to appropriate empirical objects.

The author applies his hermeneutic principles to the study of visual perception. (In fact this question is treated in the first part of the book, while the general theory is dealt with in the second part. This mode of presentation is justified by "rhetorical or pedagogical" reasons). Heelan shows (inspired in part by Rudolf Lüneburg's model of spatial perception) that many visual phenomena have the characteristics of a hyperbolic space, and that these structures of visual space have an *essential* character. (His very detailed argumentation lays stress on an analysis of normal visual perception, on the study of perceptual illusions, and on a historical study of pictorial spaces.) Euclidean structure is the product of a "technical and scientific praxis" which is inscribed within common usage across a broad variety of artifacts. Like any theoretical *construct*, Euclidean space can be directly perceived "provided that an appropriate readable technology exists." In this way, it becomes an "essential structure of the everyday world."

The method Heelan engages with regard to the particular problem [of visual space] is again used in the second part of the book to construct a general theory of perception (interpreted in a hermeneutical sense, always in conformity with Heelan's fundamental positions), and on this basis, to elaborate a philosophy of science that gets articulated according to the essentially phenomenological, thesis of "horizontal realism." The author's epistemological position permits him to develop a radical critique of "identity theories," which tend "in principle to reduce mental phenomena, such as acts of perception to brain states or to material states, without residue." Such a position also allows him, with regard to the problem posed by the interpretation of the history of science, to construct a model of rational progress that includes a "linear part" and a "dialectical part." The essential characteristic of the dialectical structure of the model is that it is represented by a nondistributive lattice. The interpretation proposed for the history of science is generalized within a theory of cultural diversity and cultural

dynamics, where the same formal structure is to be found, namely, that of quantum logic. But quantum theory is only one particular case – albeit, strictly speaking, it is a most illustrative case of a “context dependent discourse.” The entire argumentation developed by Heelan thus leads him to the following “provisional conclusion”: “In the degree to which reality is grounded on the general conditions of the possibility of perception, the structure of this ground (very likely) has the historical and dialectical structure of a nondistributive quantum lattice.”

— Jean Ladrière

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— *Translated by David B. Allison*

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