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THE FORTUNES OF INCOMMENSURABILITY

Thoughtstyles, Paradigms, and Patrick A. Heelan's Hermeneutic of Science

PATRICK A. HEELAN, S.J. — PHYSICIST, PRIEST, PHILOSOPHER

Patrick Aidan Heelan was born, very romantically, in the *1066 and All That* sense of being romantically born, on St. Patrick's Day in Dublin in 1926, as the second son of a mathematically gifted Flemish mother, Pauline Beirens, who had been sent from her native Antwerp to a convent school in Ireland, where she eventually met Matthew Henry Heelan, who, in addition to holding all the posts that are usually all we are told of a father's life, also had gifts that left a lasting impression on his family, including a passion for music, for sailing, and for roses, and who, together with his wife, raised his family, two sons, Louis† and Patrick, and a daughter, Esther, where they all grew up in a small stone house that stood on a parcel of land that ran directly to the sea, near Sandycove, in full view of the Martello Tower, not too far in space or in time from the Dublin we tend best to know from James Joyce.

Heelan, who was to become a Jesuit earlier than some boys begin to shave, began his studies at Belvedere College and, at University College, Dublin, took courses with Erwin Schrödinger and John Synge at the Institute for Advanced Studies in Dublin. A traveling studentship would take him from Ireland to St. Louis for a first doctorate in physics and then to a stint at the School of Cosmic Physics of the Institute for Advanced Studies in Dublin along with studies for a Licentiate in Theology followed by a two-year post doc in high energy physics at Princeton, for what was for him a very influential meeting with Eugene Wigner, where he also began his association with the physics department of Fordham University at Rose Hill in the Bronx. He then taught physics and cosmology at University College Dublin, did a second doctoral degree in philosophy at Louvain in Belgium, now: Leuven, writing his first book on Husserl and Heisenberg, *Quantum Mechanics and Objectivity* (1963). He took the opportunity to return to New York's Fordham University, with a year spent as a visiting Professor in Physics at Boston University along the way, and then, in 1970, he was invited to chair the department of philosophy at the State University of New York at Stony Brook, directly overseeing its development into a leading center for continental philosophy, he took on administrative responsibilities as Vice-President for Liberal Studies, taught a certain ex-biology student, the present editor, a crucial course in the philosophy of

science, and began writing a book on *Space-Perception and the Philosophy of Science* (published in 1983) – a book that was to have surprising influence in fields such as architectural design, cognitive and experimental psychology and even exo-biological research but, and this is regrettably typical, much less than its share of influence in its own focused reference to the philosophy of science. In 1983, Heelan was a Senior Fellow at the University of Pittsburgh’s Center for the Philosophy of Science. Ten years later he returned to university administration as Dean of Humanities and Fine Arts at Stony Brook. And in 1992, moved on to still more academic administrative tasks as Executive Vice-President for the Main Campus of Georgetown University. He is currently the William A. Gaston Professor of Philosophy at Georgetown University.

These are the academic milestones and accomplishments of Patrick Heelan’s life, leading to a listing in the *Encyclopédie Philosophique Universelle* – (as *Philosophe irlandais*), here translated from the French as part of the preface to this collection. But, like the above, such a prestigious account is far too spare. It fails to convey his intelligence, or his wit and Irish humor, as it has amused – and more than occasionally also disconcerted – his American colleagues. Nor can such a complex personality and the range of such a life be communicated here, to do that one needs to tell a real story, with all the resources of Ireland’s fiction. If I lack the skills to tell such a story, I know at least that it should be told. And in the “Afterword,” we shall indeed hear the tale from Heelan himself.

SCIENCE, ERROR, AND HERMENEUTICS

Ludwik Fleck, a Pole from the quintessentially rabbinical town of Lemberg (Lvov) could hardly be further from Patrick Heelan – or his Irish, Catholic Dublin roots. But they share more than one thing in common and both would endure a less than effective influence due to resistance to the associative resonances of the language they used and the very conceptual and, at the same time, very political, fortunes of incommensurability.

If Patrick Heelan invoked the phenomenological resources of Edmund Husserl in order to explore Heisenberg’s quantum mechanics, such a reference together with its associated language or conceptual terminology could not but clash with the then-contemporary scholarship (authoritative references and conceptual schemata) of the philosophy of science, which had already (as mainstream analytic philosophy in general had done) relegated Husserl to a lesser post in an hierarchic philosophical scale of clarity or fruitful philosophic expression leading not to cognizing quantum mechanics but merely to a place alongside Frege, as author of a *Logical Investigations* somewhere to be ranged behind Wittgenstein’s canonic title. It was from within the climate of analytic philosophy, the same climate that has not wavered in its dominance of professional philosophy, that Heelan first articulated his conceptual vocabulary, with talk of so many “Worlds” (of the Sportsman, of the Husband, of the physical scientist),¹ in order to express what he then called an “horizontal analysis.”² For Heelan, to talk of horizons and world, particularly the Husserlian “Life-World,” enabled an approach to the paradoxical question of nothing less than the objectivity of quantum mechanics, permitting “an analysis of the intentionality structure of quantum physics”³ and including the bugbears *indeterminacy* and *complementarity* – in terms of Husserl’s correlated conception of the noetic structure of knowing. Quantum mechanics could

thus be expressed as “the formal material theory whose function is to describe a World-for-things, and the experimental observational and operational part which makes the World-for-things also a World-for-us.”⁴ For Heelan, such a twofold phenomenological *and* hermeneutic reading of the structures of objectivity internal to quantum mechanics both in theoretical and in practical expression meant that the life-world did not come to an abrupt halt at the laboratory door.⁵

Heelan’s focus on instrumentally (and thereby significantly) mediated perception provides the key to his insight into Heisenberg’s epistemology at the level of the Indeterminacy Principle, a principle which takes as its point of departure the observation that the “act of measurement,”⁶ as the critical micro-activity of physical science, “perturbs the object” of scientific inquiry, “which yields the well-known result that the object... can be known neither empirically nor formally.”⁷ Heelan’s study of complementarity, analysing the intentionality structure of quantum mechanics, argued that measurement as such includes perturbation as a complementary component of observation because “the measuring process” rather than being objectively extrinsic to the object measured is intrinsic or “essential to the definition of a physical property.”⁸ From a literally phenomenological point of view then, “the activities which take place between object and instrument in the measuring process serve no other function than to render some physical system or some property of it, accessible to a human observer by magnifying it or otherwise ‘translating’ it into a form in which it can produce a perceptible impression on a human observer.”⁹

Thus Heelan was able to argue that “quantum mechanics shares to the full the public objectivity of science.”¹⁰ In consequence, he could also argue that an expressly phenomenological or horizonal analysis of quantum mechanics was indispensable for an adequate quantum mechanical theory of knowledge,¹¹ as Werner Heisenberg’s own definition emphasises: “quantum mechanics is a science of immanent acts and objects,” describing not “nature but our knowledge of nature.”¹² Hence, for Heisenberg, “there is no place for an objective (i.e., physically objective) science of microphysical objects, except as a science of *how we know* and not of *what we know*.”¹³

In Husserlian terms, the physicist appropriates or takes over the *intentional* perspective of the instrument itself. For the scientist in this intentional relationship, a “measuring instrument” would not then itself be an isolated thing but an extension of the scientist’s intentional orientation in which the instrument “played the part of an ‘observing instrument’ which ‘felt’ and ‘observed’ reality and ‘spoke’ of its experiences to the scientist through the ‘language’ of observable physical symbols; for the new science consciously took the point of view of an instrument immersed in nature.”¹⁴ The whole of Heelan’s later concern with readable technologies is thus pre-articulated in this context which is importantly as much hermeneutic as it is phenomenological: “The measured property produces a macroscopic effect in the instrument; as for example, a pointer reading on a scale, a ‘click’ of a counter, or a track in a bubble chamber. This macroscopic effect is a material sign. A sign has a double reality: its mental reality as a pointer, sound or bubble track, and an intentional reality proper to it as a sign.”¹⁵

Heelan invoked N. R. Hanson’s “patternings” of discovery in terms of the multifariously (depending on the research context in question) “dressed” *world* of the research scientist for whom a laboratory or research center is differently experienced than it can be for a journalist or a student, or the cleaning staff (just as the man who

operates a massive backhoe on an urban construction site experiences or “lives” the heavy machinery he controls as well as the site itself as a discrete world – here understood in contrast with those passers by, who, caught up in their own “worlds,” as we say, give neither machine operator nor construction site a second glance).

Heelan’s application of Husserl’s philosophy to an expression of Heisenberg’s physics, *qua* physical philosophy illustrates the indispensable force of both a phenomenological analysis and a hermeneutics of the same objective recourse, expressed in exact opposition to the epistemological failure of the one-to-one correspondence language schematism required by logical positivism.¹⁶ For Heelan, a phenomenological analysis in the theoretical context of quantum mechanics necessarily presupposes an hermeneutic account. And in this latter context, Heelan’s hermeneutics of scientific practice requires less the resources of pragmatism than the critical sophistication (*contra* Robert Neville’s critique) of phenomenology. To give it a Kantian stamp, a phenomenological analysis of science without hermeneutics is blind but a hermeneutic philosophy of science without phenomenology is empty.

In his earlier and later books, the phenomenological component is key to Heelan’s thinking. As Heelan expresses it, a “scientific observation” is necessarily technologically and theoretically mediated, which is to say that it is “accomplished with the aid of instruments.”¹⁷ Scientific observation is thus a matter of mapping out or “outfitting” an entire world, presupposing a trained conversancy with the report of the instrument, or the “readability” of the instrument-measurement-laboratory environment as such.¹⁸

It is tragic but all-too routine in the fortunes of the academy, i.e., the disciplinary project of the philosophy of science as a profession and as such, that for Patrick Heelan, as for Ludwik Fleck, the cognitive dissonance inevitably to be correlated with conceptual incommensurability had to make communication within the disciplinary confines and influence of the philosophy of science effectively impossible. Thus when Lawrence Sklar was invited to comment on *Space-Perception and the Philosophy of Science* at a book session on Heelan’s work at a meeting of the American Philosophical Association,¹⁹ presided over by Heelan’s fellow Irish countryman, Ernan McMullin, the commentary was never able to overcome the shock of this same conceptual dissonance to address the substance of the book charged for critical reception.²⁰ The different styles of thought between Heelan and ordinary emphases in the philosophy of science left Sklar no access to the thought at work in Heelan’s study. But the deficiencies of Sklar’s conceptual reference were derived from Sklar’s rather than Heelan’s hermeticism. Heelan had of course sought to address the reigning tradition or received modality of the philosophy of science in his book, which not only begins with a discussion of “Phenomenology, Hermeneutics, and the Philosophy of Science”²¹ but includes a very perfectly optimistic or “bridge-building” chapter on “Hermeneutics and the History of Science.”²² Heelan’s book recommended a course avoiding the twin dangers of traditional or analytic, received views in the philosophy of science as well as traditional or routinely continental accounts of hermeneutics, which continental side has for its part been burdened since Dilthey with an exactly impoverished view of the nature of the distinction between the human and the natural sciences.²³ This was the same distinction Heelan had earlier sought to bridge via the reconstitution of the fully-fledged, carefully noetic-noematic horizon called forth in the “World of the physical scientist” (a world excluding Dilthey’s famous opposition just as it excludes the

unilateral correspondence rule and scheme of ordinary philosophy of science not only of Bridgman and Campbell but also in the historical climate or episteme of the mid-sixties: Niels Bohr, John von Neumann, Eugene Wigner, and so on). For Heelan, both continentally-minded scholars of hermeneutics²⁴ and traditional philosophy of science exemplify the still today persistent conviction that “hermeneutics has nothing whatsoever to do with natural science.”²⁵ The entrenched tradition in the philosophy of science which Heelan opposes to the more socially and contextually lived views advanced by Fleck and Thomas Kuhn remains to be addressed to a specifically normative and practical research program of problem solving as instigated by Karl Popper and continued in Larry Laudan and onwards in received or establishment philosophy of science today.²⁶

INCOMMENSURABILITY AND STYLIZED RESISTANCE

The positive achievement of the present volume redresses the conceptual incommensurability between Patrick Heelan’s contributions to the philosophy of science and traditionally analytic philosophy of science. Repatriating the term “hermeneutics” within the conceptual armature of the philosophy of science is thus to take a step *beyond* both analytic and continental perspectives in philosophy. And in what I believe to be a parallel illustration of incommensurability, in the case of Ludwik Fleck – rather than hermeneutics *per se*, as the explicit adoption of a method initially conceived with reference to (religious and thence to legal) texts, to be applied to the philosophic analysis of science (as ineliminably theoretical practice) – the problem is the literal question of *style*: both Fleck’s express invocation of styles of a thought interior to science and the great obstacle to its reception in traditional philosophy of science which was entailed by the tacit *style* of biological science and medical research illustrations.

Fleck’s conceptual terminology centers around thoughtstyle [*Denkstil*] and the related if even more elusive conception of a thought-collective [*Denk-Kollektiv*], particularly with regard to the latter’s emergent properties. The alien implications of Fleck’s notion of thought-communities (throughout history as well as in modern scientific research practice) challenge Western liberal ideas of individualism and freedom – nor is it an accident that these ideas are more and not less crucial to contemporary images of science in the West. In opposition to the contemporary Western cultural emphasis on the individual and its correlative emphasis on individual scientific genius, Fleck’s philosophic reflection on the collective working or dynamic function of science foregrounds the ineluctable dependence of the individual upon or within any given, historical, thought-collective. In his landmark 1947 essay, “To Look, To See, To Know,” Fleck mused that “scientists, most frequently individualists, do not want to see the collective nature of thinking. What would remain of their renowned genius?”²⁷ But for Fleck, the individual cannot escape/surpass the collective: the thought-collective of any era is the presumed, taken for granted, but above all, the precisely *unreflected* culture of that same era. Not a *consciously* received or dominant perspective of thought, the collective is the world assumed in advance of a particular research tradition. A given scientific thought-collective is the perspective within which what is scientifically conceived *can be* conceived as such.²⁸ As Fleck’s later editors Cohen and Schnelle explain, “the individual member of a collective is not free to be

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