

# Philosophy in Review

## BOOK REVIEW

**Jan Faye.** *The Nature of Scientific Thinking: On Interpretation, Explanation, and Understanding.* Palgrave Macmillan 2014.

**PHILOSOPHY IN REVIEW**

Vol. 35, No. 1 | FEBRUARY 2015

URL: <http://www.uvic.ca/pir>

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**Jan Faye.** *The Nature of Scientific Thinking: On Interpretation, Explanation, and Understanding.* Palgrave Macmillan 2014. 348 pp. \$110.00 USD (Hardcover ISBN 9781137389824).

*The Nature of Scientific Thinking: On Interpretation, Explanation, and Understanding* is a noble effort to remedy much of the neglect within philosophy of science that pertains to context and pragmatics. The book, as the title indicates, is wide-ranging in scope, but Faye provides a thorough and detailed analysis of that subject matter that combines fair criticism of current philosophical stances with insightful emendations and suggestions to those stances. At the heart of the manuscript is Faye's pragmatic-rhetorical theory of explanation that primarily functions as a general theme that informs the arguments for most of the book. The text systematically moves from the general concepts of understanding and interpretation into specific issues of explanation before culminating with Faye's pragmatic-rhetorical theory and his pluralistic picture of the sciences.

Much of the book concerns dominant theories and hypotheses concerning explanation within Western philosophy of science. Relating explanation to understanding as the primary goal of the explanatory process, Faye addresses the dominant theories of explanation as they concern achieving understanding. In order to address the presuppositions within scientific explanations that pertain to understanding, such as background assumptions, beliefs, skills, and tacit knowledge, Faye provides an important and somewhat cursory critique of some of the dominant forms of understanding within the philosophy of science. These include the unification views of Friedman and Kitcher, casual mechanical views that are influenced by the work of Salmon, and the visualization view from classical physics. At the core of these criticisms is the thesis that explanation and understanding are context-dependent. Faye situates his position within the tradition of the Classical American pragmatists, especially Peirce and Dewey. He also declares an affinity with the positions of Scriven, Rescher, and, to a limited extent, van Fraassen. His proposal that understanding is the inherent function of explanation—that explanation is a tool to achieve understanding—surely fits within the traditions of pragmatism and pragmatics.

If understanding is the goal of explanation, then interpretation is necessary for the process of explanation that facilitates understanding. Faye indicates that there are two notions of interpretation that pertain to explanation: the construction of meaning by which phenomenon are grasped, identified, or classified, and the meaning of data provided by the process of explanation. Regarding interpretation, Faye reasons that analytic philosophers have traditionally neglected the subject by placing it within the context of discovery while placing explanation within the context of justification, thus separating the two. Faye seeks to correct this separation. This bifurcation is collapsed by highlighting the contextual nature of explanation, which is inseparable from understanding and interpretation. In the process of explanation, interpretation provides representations that facilitate understanding. Faye claims, “the act of representation is an intentional activity where an agent proposes some symbolic construct to represent a phenomenon for a certain purpose” (85). Representations are one of the most basic types of tools within the process of explanation. Faye lists models as a category of representational tools that are used to mediate scientific reasoning between phenomena and hypotheses.

Laws are also types of tools. For instance, Faye indicates that theoretical laws provide instructions to scientists about how to construct models, while fundamental laws are prescriptive and form the semantic basis of empirical generalization, i.e. descriptions of how nature behaves. In opposition to Cartwright, Faye argues that theoretical laws can neither express facts, nor have

empirical content. They are merely a set of vocabulary and linguistic rules of description and theoretical definitions. The function of theories is to provide language rules that help scientists describe and speak about certain types of phenomena. As tools, they are applied to models so as to produce predictions and hypotheses. The explanations generated by the use of theories and models are pragmatic and context dependent, according to Faye. Apart from scientific interest and knowledge, they have no value. As Faye states, "...explanation is nothing over and above its pragmatic function" (114). This conception of explanation is a technological one; to analyze explanation is to study the *technē* or craft of explaining as it relates to understanding. Faye has thus re-contextualized explanation, shifting from the traditional formal-logical approach that dominated most of the 20<sup>th</sup> century, to a naturalistic-pragmatic focus.

According to Faye, Salmon's attempts (along with those who have followed his example) to establish a general, formal-logical account of scientific explanation are doomed to fail. Ultimately, explanations depend upon the subject matter and the stance, background knowledge, assumptions, and mutual interests of scientists. Thus, the explanations generated convey different types of understanding within the sciences that are contingent upon pragmatics. To account for the shift away from the formal-logical approach, Faye provides eight reasons that nicely bridge his previous accounts of understanding, interpretation, representation, and explanation with his pragmatic-rhetorical approach to scientific explanation. The reasons provided are: different accounts are regarded as explanatory, regardless of the accounts being substantially different in type; making sense of the scientific enterprise—not merely a singular dimension of a science—includes interpretive explanations that are pragmatic and naturalistic; any meaning of a why-question apart from context does not determine the relevance of an answer (e.g. van Fraassen's example of 'Why did Adam eat the apple?'); meaning of all indicative sentences is context-dependent and entail background assumptions; explanations are often in the form of stories, which are determined in large part by the interests and background knowledge of those included in the explanatory process; change, which we attempt to understand through explanations, always takes place in a complex field of circumstances; levels of explanation depend upon our communicative interests; scientific models are always empirically underdetermined by data (186-93). Although the list of reasons is not exhaustive, it is sufficient to move from criticisms related to specific aspects of explanation to a more general account of explanation as it relates to scientific thinking. Also, it provides Faye with a foundation from which to construct his pragmatic-rhetorical theory of explanation, while providing opponents a stable field in which to engage in critical dialogue.

Faye summarizes the underlying idea of the pragmatic-rhetorical theory of explanation when he states that "explanation is a part of a communicative practice of answering explanation-seeking questions, which is intentionally directed, context-bound and persuasive; therefore, it should be understood accordingly" (241). Most of the book is a reconstruction of explanation that focuses upon the pragmatic aspects of understanding, interpretation, and explanation. Following important criticisms of Achinstein's claim that explanations are 'correct answers,' Faye provides his account of the rhetorical aspect of explanation, which "concerns expedient communication that is context-bound, directed and intentional, potentially persuasive" (251). More specifically, explanation is understood as providing understanding, being fact-oriented, truth-appealing, context-dependent, relevant to the fact explained, and asymmetrical (252-55). Utilizing the work of Lloyd Bitzer, Faye places explanation within what Bitzer had deemed the *rhetorical situation* and Faye specifies as an *explanatory situation* in which an explanation-seeking question is expressed that pertains to a problem or lack of information. The most rhetorical aspect to the pragmatic-rhetorical approach to

explanation seems to be the underlying goal to persuade, which is what gives an explanation explanatory force. Here Faye takes the greatest risk in his account of scientific explanation, but also provides the most pragmatic insight into the importance of explanatory force and the contextual factors that affect explanatory power.

There is much to praise in Faye's book, especially his facility with examples from various sciences, including physics, biology, and zoology. He masterfully keeps within the parameters of his argument regarding scientific explanation without expanding his range too widely. Surely some readers will desire more thorough criticisms of specific philosophical arguments, especially those pertaining to models of explanation and accounts of causality. Others will likely fault Faye for neglecting the history in which he situates himself. There is much from the history of Classical American philosophy that provides precedence for the pragmatic-rhetorical theory, and there are subjects from the period that are unfortunately slighted. For instance, the book merits a more thorough engagement with Peirce regarding abduction than the one Faye provides. However, these potential criticisms do not take away from the important argument that Faye is making with regard to pragmatics and rhetoric. The argument is broad enough to attract the curious eye of most who work within the philosophy of science, and it is a thorough, well-organized theory of explanation that should also merit the attention of specialists who work on explanation, semantics, pragmatics, and causality. With this book, Faye attempts to deliver a final blow to the formal-logical theory of explanation, and although there are no final blows in philosophy, he surely makes strides toward a more pluralistic, inclusive account of explanation.

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