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Genres of justification

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At times celebrated as the hallmark of philosophical approaches to science, at times condemned as ambiguous and damaging, the distinction between the contexts of discovery and justification has permeated philosophical debates since the early decades of the twentieth century (Reichenbach 1938) and caused much turmoil and despair. Even in the twenty-first century, no agreement has been reached as to whether the distinction is a useful or indeed indispensable conceptual tool for the analysis of science, whether it is irrelevant, or whether it is in fact detrimental for philosophy. Historically minded philosophers have been particularly strongly opposed to the distinction because it seemingly obstructs any attempt to promote historically or, more generally, empirically informed philosophy of science by driving a wedge between the investigation of actual scientific research and normative epistemology. I argue that on the contrary, the distinction properly conceived requires the collaboration between historians and philosophers of science.

In the philosophical literature, it is common to distinguish between two versions of the distinction: the temporal or process distinction between two consecutive processes of discovery and justification, and the version according to which two attitudes towards science, normative and descriptive, need to be distinguished (Hoyningen-Huene 1987, 2006). The normative task is to lay down the rules for theory structure, confirmation, and test, and to reconstruct fully developed scientific theories in terms of these rules; the descriptive task is to describe what actually happened in science.

Most historians and philosophers reject the temporal version of the distinction as empirically inadequate. Many philosophers agree, however, that the distinction between normative and descriptive attitudes towards science is convincing and worth keeping. In contrast, I argue that while it is conceptually awkward to oppose the process of discovery with the process of justification, there is at least one important element of the process distinction that needs to be considered and preserved in accounts of scientific knowledge production: the difference between the generation of knowledge claims in actual research and the exposition of the outcome of that research, for example in research papers. This distinction is worth keeping because it highlights a key epistemic feature of the processes of knowledge production: the mismatch between what is going on in the lab or at the bench and the reasoning that is presented in the scientific publication.

My paper examines a range of approaches to the mismatch between research practice and the exposition of knowledge claims (among others, Reichenbach 1938, Medawar 1964, Knorr-Cetina 1981, Suppe 1998, Franklin and Howson 1998, Lipton 1998). The survey shows that most historians and philosophers agree that the scientific publication, not the laboratory, is the site where scientists present what they believe to be their strongest justifications. But it is also clear that only very rarely, a period of research leads to one single identifiable textual outcome. There may be a string of research papers emerging from one project, the first research reports in conference proceedings may be followed by Nature papers, research articles, synoptic articles, review articles, synthetic expositions in handbooks, and new research proposals.

We may expect that the exposition of justificatory arguments varies with the textual genre in question: Justifications that are provided in the textbook will be different from justificatory activities that were offered in the first research reports. The transition from the research article to the textbook may be regarded as a process of justification by

decontextualization and reconstruction that the scientists themselves undertake. In most all scientific texts we will find some kind of justification for the knowledge claims that are expounded. Needless to say, textual genres also have histories. Forms of exposition change over time: textbooks and journal articles from the early nineteenth century look very different from those of today (Bazerman 1988).

The philosophically intricate question that arises is the following: Are any of these forms of justification 'more scientific' than others, and why? Should we exclude certain kinds of publications (e.g. the research proposal, the popular article) from the analysis of scientists' justificatory moves, and on what grounds? How should one acknowledge that textual genres and journal guidelines impinge on scientists' justificatory moves? What should be counted as successful justification, after all? I argue that to answer these questions, philosophical and empirical studies of (past) science must be combined in a bootstrapping procedure. The separation between normative and descriptive attitudes, while convincing in the abstract, is not viable in the actual analysis of science. To analyze fully how scientists validate their claims to knowledge, we need to be sensitive to different genres of scientific texts. We need to trace how scientists communicate scientific findings to different audiences and for different purposes. We need to analyze the formalized reconstructions in the journal article and the justificatory norms and strategies inherent in guidelines for scientific publications and research proposals and compare and contrast them with the forms of decontextualisation in the vademecum, textbook, and popular magazines. We need to trace how forms of exposition change over time. Finally, we also need to engage with the concepts of justification that philosophers of science have developed and explicated.