

## Why the dilemma of case studies misses the point: Towards an explicit methodology for integrated history and philosophy of science

By: Raphael Scholl; Kärin Nickelsen; Tim Räß

One of the challenges for an integrated history and philosophy of science is “the dilemma of case studies”: the argument that neither a “top-down” nor a “bottom-up” approach is obviously fruitful (see Joseph Pitt, 2001, *Perspectives on Science*). On the one hand, if we start with philosophical theses and proceed “downward” to historical cases, we must always suspect that the cases were chosen so as to fit our philosophical preconceptions. In other words, cases can never give real support to philosophical theses because of the possibility of selection bias. On the other hand, if we start with history of science and proceed “upward” to philosophy, then we do not have any obvious warrant for generalizations: Proper support for a philosophical thesis cannot derive from its applicability to one, two or even several cases.

Instead of accepting these challenges as refutations of the integrated approach, the dilemma of case studies should be taken as an opportunity: It points towards the need for an explicit methodology for the practice of integrated history and philosophy of science.

Where skeptics worry about selection bias, we argue that robust criteria for the choice of historical cases are required. Among the categories we propose are paradigm cases and hard cases. Paradigm cases are historical episodes which are already considered to be typical of particular aspects of science (say, confirmation) – and which thus may be used to make new points particularly effectively. Hard cases are chosen in order to make confirmation bias unlikely: They are structured such that they challenge rather than illustrate the philosophical thesis under consideration. The difficult question, of course, is what makes a case “hard”. Where skeptics argue that generalizations from historical cases are unwarranted in principle, we prefer to formulate fruitful procedures for dealing with either a match or a mismatch between philosophical theses and historical cases. For instance, instead of rejecting a philosophical thesis based on one or two counterexamples, counterexamples may indicate that a domain cannot be subsumed under a single philosophical category (e.g. several categories of explanation may exist, each of which finds counterexamples in the others). By contrast, when historical data matches a philosophical thesis, this should be understood not as straightforward “support” but instead as the beginning of an exploration of the range of applicability of the thesis.

We will illustrate each of our theses using cases from our own research in HPS. These include, among others, Semmelweis’s discovery of the cause of childbed fever, the development of photosynthesis research in the late 19th and early 20th century, Volterra’s predator-prey model and Mitchell’s chemiosmotic theory. This is a synthetic presentation of a number arguments and conclusions presented at a recent workshop titled “The philosophy of historical case studies”, held at the University of Bern on November 21-22, 2013 (<http://hpsbern2013.wordpress.com>).