

“Caught in the Middle”.  
Philosophy of Science between  
Science Studies and Formal  
Philosophy  
as Illustrated by the Sneed-Stegmüller Formalism

Christian Damböck  
Institute Vienna Circle  
University of Vienna  
christian.damboeck@univie.ac.at

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both directed by Friedrich Stadler and located at the IVC)

# Preliminary Note

- This paper presents the results of the *historical* part of a project\* that was concerned with the structuralist view of scientific theories (i.e., the Sneed-Stegmüller formalism)
- The *systematic* results of this project are already published: 'Theory Structuralism in a Rigid Framework', *Synthese*, DOI: 10.1007/s11229-011-0009-3
- By contrast to the former account, in the present context structuralism is exclusively analyzed from an external, „sociological“ standpoint.
- In order to understand the historical context of structuralism, we have to go beyond a mere reconstruction of what's going on in the 1970s in Munich. Such an account has to include more general considerations on the international development of philosophy of science in the 1960s and 1970s. Thus, a main topic of this talk will be the presentation of such a „big picture“, where structuralism comes into play only by means of an illustrative case study.

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# Overview

- (1) There are two split-offs in philosophy of science in the 1960s and 1970s
  - a. The split-off of science studies
  - b. The split-off of formal philosophy I: philosophical logic
  - c. The split-off of formal philosophy II: European style
  - d. The remaining part: conceptual philosophy (of science)
- (2) Philosophy at the icy slopes of logic?
- (3) The encounter between Stegmüller and Kuhn
- (4) A “Sneedification of Kuhn”
- (5) Why did “Kuhn Sneedified” fail?

# (1) There are two split-offs in philosophy of science in the 1960s and 1970s

- These split-offs (more or less) follow a certain pattern that was described by Martin Kusch in *Psychologism. A Case Study in the Sociology of Philosophical Logic*
- **The pattern:** a new (philosophical) discipline becomes established inside of philosophy and later develops its own life.
- Such a process has essentially two different *stages* and certain *effects*.

# (1) There are two split-offs in philosophy of science in the 1960s and 1970s

- Stage 1: **role hybridization**. Scientists who are trained as philosophers and also work as philosophers in the “old style” realm establish the new field, inside of philosophy, as somewhat “hybrid” representatives of the “new style”.
- Stage 2: **role purification**. Scientists who are mostly no more trained in the “old style” methods establish the “new style” as an independent field of research.
- Effects 1: A competitive situation emerges, especially at stage 1. This situation leads to the development of certain stereotypes or “**philosophical facts**” that essentially establish sharp demarcation lines between “old style” and “new style”
- Effects 2: These “philosophical facts” remain established even at stage 2, with the effect that the methods from the respective “other side” are not available any more, for both “new style” and “old style” philosophers.

## (1a) The split-off of science studies

- **Stage 1:** “hybrid” representatives of the “new style” were “historians” of science such as Norwood Russell Hanson, Stephen Toulmin, Thomas Kuhn, and Paul Feyerabend.
- All of them fit more or less into the old role-model of a philosopher of science, i.e., they owed expertise in the field of philosophy of science and physics
- None of them were specialized in either history or sociology of science
- The “historical turn”, as worked out by these “hybrid” representatives of the “new style” was situated on a rather programmatic level; methodologically speaking their work was fairly “old style”.

## (1a) The split-off of science studies

- **Stage 2:** “purified” representatives of the “new style” such as David Bloor, Stephen Shapin, Peter Galison, Lorraine Daston established sociological and historical science studies as independent fields of research
- They not just took over the programmatic stance from Kuhn and other “hybrids” but formulated their own, even more radical programs
- The “strong program” (Bloor), for example, seems to be a direct advancement of Kuhn’s program of the *Structure*, which was “weak” insofar as it questioned the “received view” of “old style” p.o.s. only in cases where “normal science” fails and revolutions take place
- The “strong program”, by contrast, (1) tried to describe every kind of scientific development (both “normal” and “revolutionary”, “rational” and “irrational”) at a sociological level, (2) also claimed that the “old style” notions of truth etc. are no longer valid at all

## (1a) The split-off of science studies

- **Effects:** the effects were essentially that “old style” philosophers of science identified both “hybrid” and “purified” representatives of the “historical turn” as “irrationalists”, whereas “new style” representatives of science studies identified “old style” work as irrelevant.
- On the “old style” side demarcation from the “new style” method took place, in particular, in the context of the “scientific realism” debate
- However, the situation at the “old style” side was by no means homogeneous, as classical logical empiricism obviously did not suggest a “realist” stance but rather an empiricist form of anti-realism and (moderate) relativism. The latter position was held from the 1970s onwards (most famously) by Bas van Fraassen, but also by philosophers from the Sneed-Stegmüller school



## (1b) The split-off of formal philosophy I: philosophical logic

- **Stage 1:** “hybrid” formal philosophers such as Rudolf Carnap, Richard Montague, Saul Kripke, David Lewis discussed “old style” philosophical questions at a formal level
- **Stage 2:** “purified” formal philosophers such as Johan van Benthem, Stewart Shapiro, Alisdair Urquhart, Dov Gabbay, discussed “philosophical logics” more or less independently from their initial philosophical motivations, as mere instances of “pure logic”.
- **Effects:** This kind of purification led to an establishment of some of the “new style” formal philosophers at philosophical institutes (in particular in USA, GB, NL, Sweden). Others were established at computer science and mathematics departments.
- No serious establishment of explicit and hostile stereotypes about formal philosophy of that purified kind.
- However, implicitly there seem to be a negative effect indeed, as “old style” philosophers today hardly use formal methods any more.

## (1c) The split-off of formal philosophy I: the European scene

- **Stage 2'**: in Europe, especially, in GER, AUT, NL, GB, Sweden, Finland, a second type of “purified” formal philosophers emerged in the 1970s.
- By contrast with most “philosophical logicians” these formal philosophers, though methodologically purely formal, never gave up the connection between the formalism and the initial philosophical problem
- Examples: truthlikeness, belief revision, structuralism; Theo Kuipers, Ilka Niiniluoto, Peter Gärdenfors, Wolfgang Stegmüller.
- However, one should also note that even in the US there are examples for more “European style” formal philosophy, e.g., Edward Zalta’s “Meinongian” accounts of formal ontology

## (1c) The split-off of formal philosophy I: the European scene

- **Effects'**: the effects of stage 2' (European style f.p.) were quite different than those of stage 2 (American style f.p.). Whereas in the latter a more or less peaceful coexistence at the philosophical institutes became possible, in the former this was not the case.
- The (possible) reason: European style formal philosophy tried to provide answers to “old style” questions at a purely formal level. This led to a competitive situation between “new style” and “old style”.
- The stereotype that was established at the “old style” side was essentially the claim that these accounts are “over-formalizations” and “empty” formalisms, certainly unable to contribute anything to the very “conceptual” problems of philosophy

## (1d) The remaining part: conceptual philosophy (of science)

- After these two (or three) split-offs there remained a certain variety of (new) “old style” philosophy and philosophy of science, which may roughly be defined by the formula

(old) “old style” philosophy (of science) – (s.s. + f.p.)

- Because of the establishment of certain “philosophical facts” and stereotypes the methods of science studies and of formal philosophy were no longer available in main stream philosophy (of science)
- A rather “conceptual” understanding of philosophy emerged that ruled out both “external” explanations (with the exception of “history of ideas”) and formalizations

## (2) Philosophy at the icy slopes of logic?

- In section (1) we only considered sociological mechanisms that are “internal” insofar as they are effects of the inner-scientific rational dynamics
- However, there may also be “external” effects, i.e., political and global societal factors who may be relevant as causes of the respective developments
- **Example:** George Reisch’s explanation of the establishment of a rather technical and a-political philosophy of science, as an effect of Cold War.

## (2) Philosophy at the icy slopes of logic?

- Whereas Reisch's account is concerned with philosophy of science in the 1950s in the US, we are concerned here with philosophy of science in the 1960s and 1970s, mainly in Europe.
- The Cold War may also be a factor here, but there is certainly no counterpart to the McCarthy era in the 1950s in Europe and Germany of the 1960s and 1970s.
- Rather, one has to take into account the political situation at the universities around 1968 and the heated political climate in the 1970s in Germany.

## (2) Philosophy at the icy slopes of logic?

- At this external level, we certainly cannot explain why the aforementioned split-offs took place or why any of the research programs, either “new style” or “old style”, finally failed, as all these questions are obviously a matter of the inner-scientific rationality and dynamic.
- However, we may well be able to explain, why certain research programs became extremely successful, at a certain time (insofar as they get more funding than others).
- In the latter respect, external factors may be relevant to explain the tremendous success of the Stegmüller-school, in Germany in the 1970s and 1980s
- For example, we may see structuralism as a means to establish a secure philosophical counter balance to the political “chaos” at the universities.

### (3) The encounter between Stegmüller and Kuhn

- Structuralism is relevant for our topic as a case study that shows how communication across the borders of the different split-offs took place in the 1970s, and how the respective attempts finally failed (presumably, as an effect of the above mentioned inner-scientific dynamics).
- The encounter between Stegmüller and Kuhn took place, essentially, between 1974 and 1975.
- There is an extensive correspondence from that time, and there is also the crucial event of CLMPS 1975, where Sneed, Stegmüller, and Kuhn presented their considerations on possible combinations of the program of the *Structure* with the Sneed-Stegmüller formalism



### (3) The encounter between Stegmüller and Kuhn

- We cannot go into the details of the aforementioned material here. Just a number of facts:
- Stegmüller tried to establish the Sneed formalism as a formal means for a “rational reconstruction” of crucial notions of Kuhn’s *Structure* such as “normal science”, “revolutionary science”, “scientific paradigm”, or “incommensurability”.
- Interestingly enough, Kuhn warmly welcomed Stegmüller’s attempt and took it as a valid program to “pick up my [Kuhn’s] (and other’s) incomplete enterprise and show how to carry it further”. (letter to Stegmüller from 14-08-1974)
- Nevertheless, the attempt to “Sneedify Kuhn” obviously failed insofar as the initial euphoria was gone after the symposium at CLMPS 1975 and neither Stegmüller nor Kuhn tried to develop their joint program any further, after 1975.
- Thus, the question here is simply: why did structuralism fail, as an attempt to a “Sneedification of Kuhn”.

## (4) A “Sneedification of Kuhn”

- Structuralism is based on the specification of classes  $M$  of models, by means of the basic axioms of a certain scientific theory.
- These models, then, are compared with a class  $I$  of models that represent the intended applications of a theory.
- Roughly, a theory is empirically adequate, iff  $I$  is a subclass of  $M$ .
- We then may describe different paradigms as different pairs  $(M, I)$  of  $M$ s and  $I$ s of the aforementioned form, and we may also try to describe conditions for paradigms being either commensurable or incommensurable.
- The whole framework is entirely formal (i.e., an instance of European style formal philosophy), but the basic notions are directly imported from the *Structure*.

## (5) Why did “Kuhn Sneedified” fail?

- The failure of “Kuhn Sneedified”, as a research program (i.e., in a sociological sense) is obvious.
- After the CLMPS symposium of 1975 there is hardly any further correspondence between Kuhn and Stegmüller.
- The only further reaction is Feyerabend’s review in BJPS from 1977.
- As a consequence of the latter Stegmüller completely reformulated his program as “The Structuralist View of Theories” (1979), where the role of Kuhn is rather marginal.
- The new aim of the structuralist program from 1979 is essentially to provide a scientific framework for the rational reconstruction of scientific theories of every kind, where the explanation of classical categories of philosophy of science and epistemology such as truth, knowledge, rationality plays hardly a role.
- Somewhat polemical, one may say that the new structuralist program from 1979 is the technocratic rest that remains after a removal of both Kuhn and “old style” philosophy (of science) from the initial (and much more ambitious) program.

## (5) Why did “Kuhn Sneedified” fail?

- But *why* did the more ambitious program of “Kuhn Sneedified” actually fail?
- Even before his encounter with Kuhn Stegmüller expressed to a number of correspondence partners (among others Yehoshua Bar-Hillel, Herbert Feigl, Paul Feyerabend and Carl Gustav Hempel) his fears that his highly formal account may be “caught in the middle”, in several ways, an may be accepted neither by the traditional philosophers of science nor by Kuhn and by the historians of science, etc.
- **My explanation for the failure of “Kuhn Sneedified” is essentially that Stegmüller’s fears were not ungrounded:**

## (5) Why did “Kuhn Sneedified” fail?

- 1) The reactions of “hybrid” historians of science were friendly, only at the beginning (and only in some cases). The process of purification and polarization, in the middle of the 1970s, led to a situation where both hybrid and purified “historians” were no longer interested in such an “old style” account as “Kuhn Sneedified”.
- 2) The reactions of “old style” conceptual philosophers (of science), in this polarized climate, were also quite un-friendly, because those philosophers (of science) identified “Kuhn Sneedified” as an over-formalization.
- 3) Finally, even the colleagues in the other fields of (European style and American style) formal philosophy (possibly, with the exception of belief revisionists) were anything but enthusiastic about “Kuhn Sneedified”, because it obviously established a sort of relativism and anti-realism that other varieties of formal philosophy (e.g., truthlikeness) wanted to overcome.

# Conclusion

- The failure of “Kuhn Sneedified” is essentially a result of the polarization of the scientific climate in the middle of the 1970s
- However, today, the idea of trying to combine the empirical ideas from the realm of the science studies tradition with the formal ideas of the realm of the formal philosophy tradition(s) gains new interest, because we may be able to combine two varieties of philosophy here that both share their undeniable *scientific* nature.
- Thus, a cooperation between “formal” and “empirical” philosophy seems desirable
- Against that background, a reconsideration of “Kuhn Sneedified” may be of some interest