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THEORY-CHANGE AS STRUCTURE-CHANGE:
COMMENTS ON THE SNEED FORMALISM*

1. Introduction

It is now more than a year and a half since Professor Stegmüller kindly sent me a copy of his *Theorie und Erfahrung* (Stegmüller, 1973), thus drawing my attention for the first time to the existence of Dr. Sneed's new formalism and its likely relevance to my own work. At that time set theory was to me an unknown and altogether forbidding language, but I was quickly persuaded that I must somehow find time to acquire it. Even now I cannot claim entire success: I shall here sometimes refer to, but never attempt to speak, set theory. Nevertheless, I have learned enough to embrace with enthusiasm the two major conclusions of Stegmüller's book. First, though still at an early stage of its development, the new formalism makes important new territory accessible to analytic philosophy of science. Second, though sketched with a pen I can still scarcely hold, preliminary charts of the new terrain display remarkable resemblance to a map I had previously sketched from scattered travellers' reports brought back by itinerant historians of science.

The resemblance is firmly underscored in the closing chapter of Sneed's book (Sneed, 1971, esp. pp. 288–307); its detailed elaboration is a primary contribution of Stegmüller's. That the rapprochement both see is genuine should be sufficiently indicated by the fact that Stegmüller, approaching my work through Sneed's, has understood it better than any other philosopher who has made more than passing reference to it. From these developments I take great encouragement. Whatever its limitations (I take them to be severe), formal representation provides a primary technique for exploring and clarifying ideas. But traditional formalisms, whether set-theoretical or propositional, have made no contact whatsoever with mine. Dr Sneed's formalism does, and at a few especially strategic points. Though neither he, nor

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Stegmüller, nor I suppose that it can solve all the outstanding problems in philosophy of science, we are united in regarding it as an important tool, thoroughly worth much additional development.

Just because the new formalism does illuminate some of my own characteristic heresies, my evaluation of it is unlikely to be free from bias. But I shall not pause merely to deplore the inevitable. Instead, I turn to my subject proper, beginning with a cursory sketch of some aspects of the new formalism that seem to me particularly appealing. Premising them, I shall next explore two aspects of the Sneed-Stegmüller position that, in their present form, seem to me significantly incomplete. Finally, I shall examine one central difficulty that will not be resolved within the formalism but presumably requires resort to philosophy of language. Before turning to that program, however, let me avoid misunderstanding by indicating an area in which this paper makes no claims at all. What has excited me about the Sneed formalism is the issues it makes it possible to explore with precision, not the particular apparatus developed for that purpose. About such questions as whether or not those achievements demand the use of set and model theory, I have no basis for opinions. Or rather, I have a basis for only one: those who think set theory an illegitimate tool for analysing the logical structure of scientific theories are now challenged to produce similar results in another way.

2. APPRAISING THE FORMALISM

What has struck me from the start about the Sneed formalism is that even its elementary structural form captures significant features of scientific theory and practice notably absent from the earlier formalisms known to me. That is perhaps not surprising, for Sneed has repeatedly inquired, while preparing his book, how theories are presented to students of science and then used by them (e.g. Sneed, 1971, pp. 3f., 28, 33, 110–114). One result of this procedure is the elimination of artificialities that have in the past often made philosophical formalisms seem irrelevant to both practitioners and historians of science. The one physicist with whom I have to date discussed Sneed’s views has been fascinated by them. As an historian, I shall myself