

Unity, (Inter)nationalism, and Science

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Pursuing the Unity of Science: Ideology and Scientific Practice from the Great War to the Cold War, edited by the late Harmke Kamminga and Geert Somsen, is a collection of ten essays (with an introduction that provides the context), delivers exactly what the title promises: an account of the ideology and practice of unified science. With its consciously structured case studies, the volume exemplifies nicely the theme of the series it is part of, Routledge's *Science, Technology and Culture, 1700-1945*.

"Unity of Science" or "Unified Science" ("UoS") meant, and still means, various things and, by extension, the same is true of "Disunity of Science". One might think that there is only one *genuine* science, and that all the various disciplines and approaches are just historically contingent, even if they seem to be fruitful divisions. The general question of what provides the 'cement' that does the unification (common concepts, laws, methods, entities) is rarely asked nowadays – since a major part of contemporary philosophy of science has moved towards the actual, micro-level description of scientific practice. So one might wonder about what we can learn from a volume on unity, given that the whole motivation for the project of a unified science is almost entirely off the table. Two things must be mentioned here: (1) the process of how these questions were buried in the backyard has hitherto rarely been asked, and (2) the history of failure may provide some more interesting morals to consider. The volume succeeds in both of these tasks.

Philosophy of science, especially where it is concerned with the idea of unity, is often entangled with such epistemological and ontological questions, as how theory-reduction, translations between

vocabularies and isomorphic relations between different structures are possible and actualized. These questions were asked and pursued, for example, by Ernest Nagel, Carl G. Hempel, Herbert Feigl, and to some extent W. V. O. Quine – in a nutshell, by logical empiricist philosophers of science. Nonetheless, the purely abstract and technical matters did not exhaust all possibilities, as the volume nicely attests, neither in the logical empiricist camp nor outside of it. One of the great merits of the volume are the diverse perspectives on the idea that unity of science was always more than just a scientific hypothesis requiring experimental or theoretical justification.

What were the reasons then for the various “unity of science movements”? As it turns out from the very first chapter onwards, “unity of science” had always been entangled with practical reasons in the widest sense. Thus, the question emerges: Was there any epistemic rationale behind these, and if yes, how did it function and was it related to these practical reasons? Instead of going through all the chapters individually (which present various case studies and much historical information), I will summarize the chief lines of argument, the ideal and general patterns behind the approaches documented in the book.

One thing that needs to be noted right at the beginning is that “unity of science” was mainly an *ideological* project. Once we accept this idea, it becomes a lot easier to understand the ups and downs of UoS in the twentieth century: rapid and wide-ranging changes in society, politics, culture – and, by extension, in *ideology* – went hand in hand with promoting and/or rejecting the idea that science is united. But how is it relevant to social or political concerns that science is one or many *per se*? The answer is not at all settled for now, but one thing seems to be sure: In the interwar period, UoS was a scientific and a *political* ideal as well. It claimed that scientific knowledge and the

various epistemic virtues encoded in scientific practice (such as experimentation, intersubjectivity, simplicity, predictive-force, etc.) would empower both the individual and the masses. As Fernando Salmón and Rafael Huertas show in Chapter 7, during the Spanish Civil War, the advocates of modernism and the secular state (defenders of the so-called Second Republic), used the idea of unified science against the fascist state “as an agent in modernization”.

Thus one might be led to expect that by varying the political and cultural contexts, the details and exact aims of UoS would vary as well. In Chapter 2, Peter Galison reconstructs that idea. He differentiates three phases of the “meanings of scientific unity”: (1) a nationalist-metaphysical one (during the second half of the 19th century with Emil Du Bois-Reymond, Hermann Helmholtz and Ernst Brücke); (2) an internationalist-antimetaphysical one (1918-1939, with logical empiricism); and finally (3) a mainly epistemological-metaphysical one (in the second half of twentieth century, associated with the search for the ‘ultimate building blocks of the universe’). As Galison claims, “unity has come to mean different things at different times at different places – there is a *dis*-unity to the genealogy of unity” (p. 12).

Nonetheless the aforementioned three senses of unity, “nationalist”, “internationalist”, and “metaphysical”, form the core around which all the other versions that were pursued in different places, times and contexts can be organized. Various forms of nationalism (usually “*national science*”) are taken up in Chapter 4 (on Rutherford and his Cambridge laboratory), Chapter 5 (which deals with Dutch scientists promoting *Dutch science* and later nationalism in the 1930s), and Chapter 8 (Paul Rotha as a documentarian of British reconstruction and planning). Though these forms of nationalism cannot be equated with the extreme nationalism that haunted Europe (and even beyond)

after the 1930s, they still point to the fact that unified science in itself is not – at least not internally and exclusively – interwoven with internationalism.

Nevertheless, internationalist aims (such as world peace, progress, global health, world education etc.) provided the main slogans for many of the UoS movements. Among the various forms of internationalism, one finds *humanism* (the topic of Chapters 3 and 9), *socialism* (Chapters 5 and 11), the ideal of a *world-state* (Chapter 6), and secularized *modernism* (Chapter 7). But despite the aforementioned nationalistic leanings of Rutherford, Dutch scientists, and Rotha, all of them had either an internationalist phase or some leanings towards internationalism as well.

As I mentioned above, UoS was mainly an ideology, or had ideological motivations (and not, for example, purely first-order “technical” reasons). Thus, even if we find professional scientists among its advocates, the main job of promoting the idea was done by non-academics – a fact that still awaits closer analysis. Though the defenders of the various UoS approaches were non-academics (or scientists who pursued the ideal in non-academic contexts), this does not, of course, mean that science did not play a role in the unification process. Interestingly, all the efforts documented in the book were *naturalistic* in the sense that unification was based *on science* itself: Its advocates did not consider philosophy to be a “super-science” which would unify the sciences in a top-down fashion. It was never quite settled, however, which science should take the lead in this process: Julian Huxley utilized biology, H. G. Wells developed a comprehensive project around the “science of life”, Paul Rotha worked with films and thus communication, Spanish scientists envisioned the modern secular unity through neuropsychiatry, while

Otto Neurath framed his *International Encyclopedia of Unified Science* around logic and the social sciences at the same time.

Adding ideology to non-academic scientific popularizing did not always end up a resounding success. The majority of practicing scientists were not enthusiastic about UoS (see especially Chapters 3, 6, and 9). They either disliked the idea of combining first-order science with *any* social and/or political concern, or were simply disinterested in such a project, since they thought that UoS had nothing substantial to add to the *content* of their research.

Furthermore, there were other reasons as well: Chapters 10 and 11 describe how the socially and politically engaged philosophy of European logical empiricism (and the corresponding ideal of UoS) failed in the United States. We get two different perspectives and stories: David Hollinger (Chapter 10) claims that there were some “aspects of the American scene that Neurath and others of the Vienna Circle were slow to comprehend” (p. 217), at least partly due to the fact that their idea of scientifically structuring the shape of life and consciously producing tools for societal empowerment had already been in play there for many decades. On the other hand, George Reisch (Chapter 11) describes a story of initial success (evidenced by how Neurath, Carnap, and Philipp Frank seamlessly blended into the American atmosphere), and its subsequent failure during the Cold War (due to the socialist – sometimes overt, sometimes merely tacit – tendencies of Neurath’s UoS idea).

Things have changed recently on many fronts: During the second half of the twentieth century, once philosophy of science had been institutionalized as a theoretically oriented (and, in a sense, paradigm-driven) profession, much, if not all, of its socially and politically engaged character (of nationalism and internationalism)

vanished. Thereafter, even where UoS surfaced occasionally (e.g. in Hilary Putnam's and Paul Oppenheim's famous paper "Unity of Science as a Working Hypothesis"), it was viewed only in the context of epistemic and theoretical virtues of structural simplicity, ontological economy, and empirical description of the structure of the world (see Galison's chapter). Whereas during the interwar period, social and moral virtues were firmly attached to these epistemic ones (like unified language ensuring inter-national communication, or the explication of inter-scientific relations as a way of strengthening planning and socio-cultural reconstruction), this neatly constructed chain was permanently broken in the Cold War and later disappeared.

The nucleus of an interesting explanation of all of these is hinted at in Chapter 4; there Jeff Hughes shows that in Rutherford's debate with the Viennese physicists, "controversy and interlaboratory rivalry, rather than conceptual consensus or methodological unity, were the drivers for advance" (p. 73). By reconstructing many details from this – partly scientific, partly rhetorical – controversy, Hughes notes the advantages of leaving behind the UoS ideal. However, one might formulate another narrative: the *internal* progress and practice of science are, in fact, nourished by *disunity*, competition, argumentation, skepticism, specialized fragmentation and the pursuit of success, while the *external* popularization, humanization, and teaching of science might indeed be promoted by UoS as an ideological movement. The latter (and this was exactly the argument of Otto Neurath and Philipp Frank, the director of Institute for the Unity of Science during the late 1940s) might also be helpful in emphasizing the social embeddedness and relevance of science. But that is another story, for another day.

One of the editors, Harmke Kamminga passed away in 2013 – the present volume, *Pursuing the Unity of Science*, envisioned by her is an

excellent example of why the history of philosophy of science might matter. Ideology and Scientific Practice (the two core themes of the chapters) were entangled, accounting jointly for the motivation, driving force, and the success of the Unity of Science movement, as well as its failure. Kamminga's and Somsen's volume, with its important individual contributions, insightful figures, and a systematically arranged index, will be a lasting contribution to the history of science, philosophy, persons, and institutions in the context of unification during the interwar period.

Harmke Kamminga and Geert Somsen (eds.)

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