

The rise of logical empiricist philosophy of science and the fate of speculative philosophy of science

Katzav, J. and Vaesen, K. (2022) *HOPOS: The Journal of the International Society for the History of the Philosophy of Science*, 12(2). <https://doi.org/10.1086/721135>.

Abstract

This paper contributes to explaining the rise of logical empiricism in mid-twentieth century (North) America and to a better understanding of American philosophy of science before the dominance of logical empiricism. We show that, contrary to a number of existing histories, philosophy of science was already a distinct subfield of philosophy, one with its own approaches and issues, even before logical empiricists arrived in America. It was a form of speculative philosophy with a concern for speculative metaphysics, normative issues relating to science and society and issues which later were associated with logical empiricist philosophy of science, issues such as confirmation, scientific explanation, reductionism and laws of nature. Further, philosophy of science was not primarily pragmatist in orientation. We also show, with the help of our historical characterization, that a recent account of the emergence of analytic philosophy applies to the rise of logical empiricism. It has been argued that the emergence of American analytic philosophy is partly explained by analytic philosophers' use of key institutions, including of journals, to marginalize speculative philosophy and promote analytic philosophy. We argue that this use of institutions included the marginalization of speculative and value-laden philosophy of science and the promotion of logical empiricism.

Acknowledgements: we would like to thank the paper's anonymous reviewers for their useful comments.

Keywords: logical empiricism; twentieth-century philosophy; history of philosophy of science; American philosophy; science funding; philosophy of science

1. Introduction

The 1930s saw the immigration to (North) America of European logical empiricists and, in subsequent decades, the quick rise to dominance of their brand of philosophy of science in that land (see, e.g., Giere 1996; Stadler 2007). A common history has it that, after the logical empiricists' arrival, part of what they contributed to American philosophy was a theoretical framework and set of problems that for the first time delimited the philosophy of science from other fields of philosophy and from non-philosophical research into science. Thus, Scott Edgar takes 1930s American philosophy of science to have, in general, "offered learned commentary on science and its place in society" and not to have been clearly distinguished from related fields—psychology, sociology, etc.—studying science (2009, 185). What the logical empiricists contributed when they came to dominate philosophy of science in the late 1940s and 1950s, claims Edgar, was "a conception of philosophy that marked off some methods of analysis and inference as distinctly philosophical." They brought with them a shared theoretical background (the techniques of logical analysis) and shared problems (the analysis of concepts such as causation, scientific explanation, laws and confirmation) (186). Similarly, Fons Dewulf believes that it is in the 1960s that philosophy of science "becomes a recognized subdiscipline in philosophy disconnected from the sciences themselves" (2021, 936). And Friedrich Stadler identifies logical empiricist work in the early 1940s as "the beginning of the specific American philosophy of science" (2007, 583). George A. Reisch's (2005) characterization of American philosophy of science before and during the emergence of logical empiricism fits these perspectives. Insofar as an alternative to logical empiricist philosophy of science is identified in recent literature, it is pragmatist philosophy of science (see, e.g., Giere 1996).

Another focus of recent histories of philosophy of science associates the rise of logical empiricism in America with a change in philosophy of science's normative orientation. It has been argued that, from the late 1940s, philosophy of science starts to avoid active engagement with social, political and moral concerns (Howard 2003; Reisch 2005; Douglas 2009). More precisely, the claim is that philosophy of science came increasingly to eschew what we have elsewhere (2019) called 'value-laden approaches to philosophy of science', i.e., approaches that aim to offer empirical descriptions of non-cognitive (social, political, moral) values in science or normatively to appraise aspects of the scientific enterprise using non-cognitive values.

We provide a novel portrait of (American) philosophy of science during the period 1900-1950, before the dominance of logical empiricism, along with a novel understanding of what logical empiricism contributed to American philosophy. We also offer a novel explanation for the rise of logical empiricism and for the associated withdrawal from value-laden philosophy of science.

Contrary to Edgar, Dewulf, Reisch and Stadler, we show (section 2) that philosophy of science already became a recognized sub-field of American, academic philosophy in the early decades of the twentieth century, that this sub-field continued to be in place until the middle of the century and that its approaches and issues fitted the framework of speculative philosophy, with an emphasis on speculative, science-informed metaphysics and on value-laden philosophy of science. We also show that pragmatism was a minority approach within philosophy of science and that the field was already addressing the problems that came to be central to logical empiricism and, more broadly, analytic philosophy of science in the 1950s and 1960s.

We then apply (section 3) our recent institutional explanation for the emergence of analytic philosophy (Katzav and Vaesen 2017a, 2017b; Katzav 2018) to the case of the rise of logical empiricism. We have argued that part of the explanation for the dominance of analytic philosophy in the United Kingdom and America is the success of analytic philosophers during the period 1925-1969 in taking over key academic institutions, including key journals, and using this control to promote analytic philosophy and to marginalize speculative and other forms of non-analytic philosophy. Analytic philosophers were able to do this at least partly because speculative philosophers' pluralism about philosophical approach led them to give analytic philosophers positions in journals and other academic institutions, positions which analytic philosophers subsequently exploited for their own ends. We here argue, in light of our observation that pre-1950s philosophy of science was predominantly speculative, that the institutional opposition to speculative philosophy also plays a part in explaining the rise of logical empiricism. We further observe that, because of the association of speculative philosophy of science with value-laden philosophy of science, the account we offer here fits neatly with our earlier claim (2019) that logical empiricist opposition to value-laden philosophy of science plays a part in explaining philosophy of science's withdrawal from societal concerns. Moreover, we discuss the bearing of our partial explanation for the rise of logical empiricism on some other potential explanations found in the literature.

Finally (section 4), we support the claim that value-laden philosophy of science still had a substantial presence in American philosophy in the 1950s and 1960s. This claim is disputed by Dewulf (2021) but is to some extent an implication of our argument in section 3, specifically of the observation that speculative philosophy was still a force in 1950. Further, that value-laden philosophy of science persisted in the 1950s and 1960s makes clear that it was sustained pressure exerted by analytic philosophers, including logical empiricists, over these decades that marginalized speculative philosophy of science. We also consider whether

logical empiricist opposition to value-laden research as such was part of the reason for the withdrawal of philosophy of science from societal concerns or whether this withdrawal was merely a result of the association of value-laden work with speculative philosophy. We argue, in line with our earlier work (2019), for the first of these alternatives.¹

Section 5 wraps up our article.

2. American philosophy of science (1900-1950)

Looking at surveys of American philosophy from 1950, or from immediately prior to 1950, we see that philosophy of science is mentioned as a sub-discipline of philosophy in America and is covered separately from other fields of philosophy (Brightman 1946; Collins 1950). Earlier surveys (Morris 1935) also recognize philosophy of science as a sub-discipline. While these surveys note the work of the logical empiricists, and the 1950 one notes the existence of American, logical empiricists, logical empiricist work is contrasted with the work of an older, American philosophy of science tradition. Thus, for example, the 1950 survey notes that the

¹ There has been substantial discussion of whether logical empiricists, especially the Left Vienna Circle (LVC), were politically engaged philosophers of science (See, e.g., Romizi 2012; Lavine 2020). We, however, are not concerned with figures from within the LVC, but only with certain logical empiricists who had positions of influence in the 1950s and in the 1960s. Moreover, we accept that, in a sense, some of these figures had a political orientation that drove their philosophy of science. Our claim will just be that, insofar as they had such an orientation, it aimed to achieve political goals indirectly by impacting society through the practice of logical analysis rather than by discussing normative issues or empirically investigating the non-cognitive aspects of science.

program of the new positivists “was somewhat blunted...by the fact that the other American philosophers of science did not share the same faith in positivism and the analysis of language” (Collins 1950, 61). The 1935 survey notes that American philosophy of science is then becoming more attentive to the work of the Vienna Circle (Morris 1935, 148).

Further, a number of books from the 1930s and the early 1940s by professional philosophers are on philosophy of science and cover the field, either by way of surveying it or in order to support a novel position in it (Swabey 1930; Cohen 1931; Northrop 1931; Benjamin 1936, 1937; Werkmeister 1940; Ramsperger 1942). These books explicitly recognize the emergence of the sub-discipline of philosophy of science (Benjamin 1936, Chapter I). Abram Cornelius Benjamin’s 1937 book (1937, Preface) is designed as a textbook for the many philosophy of science courses which were being developed in the years before it came out. The same is true of Albert G. Ramsperger’s book (1942, Preface). Logical empiricism is initially absent from these books but begins to be recognized as one school in the philosophy of science as the 1930s progress.

Finally, there are a substantial number of philosophers working in America who, roughly during the period 1910-1950, are academic philosophers of science, that is, they are academic philosophers and have the philosophy of science as a primary or sole area of research.² These include Benjamin, Edwin A. Burt, Charles West Churchman, Morris R. Cohen, George Conger, Grace A. de Laguna, Theodore de Laguna, John Dewey, Ray H. Dotterer, Lewis S. Feuer, Cornelius L. Golightly, Sidney Hook, Louis O. Kattsoff, Thelma Z. Lavine, Edgar A.

² It would be a mistake to endorse a narrower definition here, e.g., one that only fits the post-1950s logical empiricist philosophy of science. Such a definition would merely shift the burden of explanation to that of explaining why one group of professional philosophers studying science came to dominate the study of science at the expense of another.

Singer Jr., David L. Miller, Ernest Nagel, Filmer S. C. Northrop, Stephen C. Pepper, Albert G. Ramsperger, Joseph Ratner, Oliver L. Reiser, Roy Wood Sellars, Harold R. Smart, Marie T. C. Swabey, Andrew Ushenko, Philp P. Wiener, William H. Werkmeister, Alfred North Whitehead and others (see Table A in the appendix for a selected list of publications of each).

Thus far, we have indicated that there existed a local, American philosophy of science tradition during the period 1910-1950 and that this tradition predates the arrival of the logical empiricists in America. Indeed, judging by the numbers of substantial philosophy of science publications at around about 1930 (see Table A), the local, American tradition was already well developed before the logical empiricists' arrival. The already mentioned 1935 survey agrees with our conclusion here. It traces the American concern with philosophy of science back to the decades around the turn of the twentieth century and aims to present the established, American philosophy of science tradition as it was in 1935 to an international audience (Morris 1935, 142).

We characterize the field of philosophy of science during the period under consideration by noting some key aspects of its largely shared theoretical background as well as some of the issues it covered. We first offer a general characterization of the background and of the issues and then make the characterization more concrete by discussing the work of a number of key philosophers of science from the period. Since one of our goals is to contrast a local, American philosophy of science tradition with what the immigrant logical empiricists brought with them, we do not include immigrant logical empiricists in our story.

The theoretical background of American philosophy of science included a distinction between critical and speculative components of philosophy of science (in addition to the references below, see Benjamin 1937 for a general discussion of the distinction). The critical component was taken to include the analysis of science, including of its inferences, claims

and presuppositions, and used standard philosophical techniques of analysis. Problems covered in this part of philosophy of science concerned, among other things, measurement, confirmation, scientific explanation, laws of nature, causation, probability, reductionism, scientific realism and space and time. The speculative component of philosophy of science was (very roughly) taken to include criticizing, and building on, science in order to go beyond it and learn more about reality. A key problem in this area was that of how to synthesize the results of the special sciences (including physics) in order to develop a systematic metaphysics. Figures regularly cited as key to the development of the speculative part of philosophy of science are Dewey and Whitehead, among others. The substantive claims of speculative philosophers of science, that is, of philosophers of science who identified themselves as contributors to the speculative component of philosophy of science, were not, however, restricted to those of metaphysics. These claims included empirical, evolutionary epistemologies and substantive normative claims that described and addressed social, political and ethical issues. Of course, the speculative and critical components were interrelated, that is, critical positions were informed by speculative stances and vice versa. Importantly, however, not all American philosophers of science during this period were sympathetic to speculative philosophy of science; a small minority reject it. Also important, speculative philosophy of science was understood to be a species of speculative philosophy. While speculative philosophy generally aimed to produce its own, independent substantive claims about reality through critical engagement with established opinion (Katzav 2018), speculative philosophy of science put particular emphasis on engaging with science in developing substantive claims.

Cohen's philosophy of science provides a first illustration of the speculative side of early American philosophy of science. In responding to pragmatism and new realism at the turn of the twentieth century, Cohen defends a conception of philosophy according to which it is a

form of philosophy of science that aims to develop a vision of reality while learning from, and criticizing, the sciences (1910, 1927 and 1931). As he succinctly puts it in his 1931 book *Reason and Nature: An Essay on the Meaning of Scientific Method (Reason)*, “[p]hilosophy, seeking the most comprehensive vision, cannot ignore the insight gained by the sciences, but must go forward to envisage their possible synthesis” (1931, 149). The specific vision of reality which Cohen endorses is a form of perspectival realism that centers around what he calls ‘the principle of polarity’. This, he writes, “is the principle, not of the identity, but of the necessary copresence and mutual dependence of opposite determinations” (1927, 679). The idea here is that nature comprises elements exhibiting opposing characteristics, e.g., “unity and plurality, rest and motion, substance and function, actual and ideal, etc.” (679). By implication, reductivism is opposed, e.g., the mental and the material are taken to be two fundamental aspects of the universe (1931, 321-322). Moreover, philosophy must somehow resolve the apparent tensions between the pairs of opposing elements revealed by science by showing how, though they are real and distinct, they qualify elements in different, compatible ways (1927; 1931, 369). Where science does not recognize polarities, philosophy ought to drive scientific development by pointing these out (369). The inherent vagueness of scientific concepts, and perhaps even of reality, also needs to be recognized where it is unclear which of pairs of opposing characteristics are possessed, e.g., when the common-sense distinction between hot and cold breaks down (1927).

Reason also illustrates Cohen’s value-laden philosophy of science and his critical philosophy of science. Value-laden work is found, for example, in the book’s examination of ethical and political issues in light of developments in the social sciences and in light of the principle of polarity. The principle of polarity, and thus speculative vision, is here used to illuminate humanity and its place in nature. The principle also informs the book’s critical components, which include a general discussion of the logic of science (including of

measurement, laws of nature, scientific explanation, confirmation, discovery versus confirmation and reductionism) as well as treatments of the philosophy of physical science, the philosophy of biology, the philosophy of psychology, the philosophy of the social sciences and the philosophy of history.

Nagel, Hook, Feuer, Ratner and Wiener were Cohen's students (Delaney 2004; Lavine 1981). Their work also illustrates the speculative and critical aspects of early American philosophy of science. We focus here on Nagel, Hook and Ratner. Speculative philosophy of science is an important part of the background against which Nagel is working after the award of his PhD in 1931; he spends a substantial amount of space criticizing speculative philosophy (see, for example, his 1954 book *Sovereign Reason and other studies in the philosophy of science*). As an opponent of speculative philosophy, he takes philosophy to aim at examining and reconstructing scientific claims and arguments. That he does so is clear in his logical empiricist commitments. In relatively late work, for example, he writes that "philosophy can briefly be defined as the analysis of categories" (1957, 41) and that logical analysis is "a major if not exclusive task...that the philosophy of science undertakes to execute" (1961, 15).³ Nevertheless, Nagel's work fits well into the field of non-immigrant, American philosophy of science. Like his teacher Cohen, Nagel identifies philosophy with

³ Nagel, to be sure, had a metaphysics that superficially resembles Cohen's, one that acknowledges that a "manifest plurality and variety of things, of their qualities and their functions, are an irreducible feature of the cosmos" (1956, 7). But Nagel's position supposedly "articulates features of the world which, because they have become so obvious, are rarely mentioned in discussions of special subject matter" and which are "meagre in content" (6-7). While Cohen aims, as a metaphysician, to go beyond science, Nagel rejects the speculative stance and insists instead that he is just articulating what we already know.

philosophy of science (Nagel 1954, 298; Schliesser 2022). Moreover, the issues and positions Nagel focuses on throughout his career were the critical issues we have already noted were found in Cohen's 1931 book and, as we will now see, in the work of other speculative philosophers of science.⁴

Hook and Ratner were speculative philosophers of science. In Hook's 1927 book *The metaphysics of pragmatism*, which is dedicated to, among others, Cohen, we are told that philosophy is primarily vision rather than careful argument (1927, Acknowledgements) and that the book aims to develop a metaphysical system that "squares up with the world of scientific and social practice" (15). On the critical side, Hook's book is concerned with laws of nature, scientific inference and scientific explanation. Ratner too (1937) aims at a speculative metaphysics, one the generalizations of which start from science but go beyond it to envisage that all aspects of reality evolve and have an historical nature. And, on the critical side, Ratner deals with issues such as the nature of scientific inference and of scientific explanation (see, e.g., his 1935).

A further illustration of the speculative and critical sides of philosophy of science from the period under consideration is found in the work of the de Lagunas, Smart and Swabey. Grace de Laguna's vision of reality, like Cohen's, is a form of perspectival realism. She posits individuals that cannot be fully characterized in conceptual terms and, by implication, the behavior of which cannot be fully explained by science. The different special sciences

⁴ We agree with Schliesser (2022) that Nagel also thinks that the philosophy of science aims to promote liberal values. As we read Nagel, his view is that the philosopher of science's use of logical analysis itself promotes liberal values, but the philosopher of science does not directly engage with such values. Nagel does not espouse practicing value-laden philosophy of science.

nevertheless reveal different, irreducible aspects of individuals' natures. Initially, the individuals that existed were relatively simple and had only physical aspects. However, additional aspects, including biological, psychological and sociological aspects emerge in an evolutionary process (1899, 1917a, 1917b; Katzav, forthcoming-a). She also develops detailed empirical hypotheses about how simple forms of representation found in animals evolve into the more sophisticated forms of cognition found in humans (1927; Katzav, forthcoming-a). Moreover, with her husband, Theodore de Laguna, she tells a story about how our non-scientific concepts evolve into scientific ones and about the evolution of different forms of scientific concepts. In this context, they argue that scientific theories are no more than true enough for the purposes to which they are put, in line with Grace's view that the special sciences only uncover perspectives on individuals (1910; Katzav, forthcoming-b). Theodore (1926) broadens the story of the evolution of science into an account of social change, one that synthesizes results from relevant empirical disciplines.⁵

In developing the speculative side of their philosophy of science, the de Lagunas make substantial contributions to critical philosophy of science. In 1910, they offer a critique of pragmatist philosophy of science, a critique of the analytic-synthetic distinction, a critique of (what came to be called) Quinean confirmation holism, a moderate form of epistemic holism and a methodology of research programs (1910; Katzav, forthcoming-b). In the 1910s, Grace de Laguna develops a multiple-realizability based critique of scientific reductionism (1917a,

⁵ We note that Theodore's 1926 discussion of whether there are innate, race-related differences in intelligence (1926, 99-133) uses problematic language that reflects the prejudices of the time, though his aim appears to be to reject the case for such differences. The de Lagunas' 1910 book includes (1910, 160) a potentially racist claim, though it does not explicitly identify a particular race or seem to express racial superiority or animosity.

1917b; Katzav, forthcoming-a). She also, in the same decade, offers an explication of the concepts of psychology, one that involves a private language argument and criticism of the idea that psychological science might concern itself with essentially private mental states (Katzav, forthcoming-a). Theodore critiques the idea of induction and proposes an explicitly falsificationist variant of the methodology of research programs (1926, 1930). Both the de Lagunas take value-laden philosophy of science to be integral to the philosophy of science. They, for example, take it to be part of their job to develop a science-informed account of the development of modes of valuation among humans (see, e.g., their 1910 and her 1927).

Swabey's (1930) philosophy of science includes, on the speculative side, the view that the universe is a unified whole with an essence. Further, the universe's essence necessitates that the universe's constituents conform to logic and mathematics, and are atomistic and law governed. She aims to justify her view on synthetic, a priori grounds and, more broadly, takes the existence of synthetic a priori knowledge to be required for the possibility of scientific knowledge. Her critical philosophy includes a critique of naturalistic epistemologies of science (including those of pragmatism and those in the spirit of that of the de Lagunas), theories of inference, measurement, confirmation and probability, a defense of scientific realism, a defense of explanatory reductionism and a vindication of induction. Smart (1931) too is explicitly committed to a speculative philosophy of science, one that is particularly Hegelian in orientation. He aims to reinterpret the special sciences' understanding of the external world so as to reveal their limitations, illuminate the evolving nature of scientific judgement and, ultimately, develop a metaphysics that shows how scientific judgments and their objects depend on each other and are part of a single system of experience (1-33, 217-225; 1934). The critical component of his philosophy of science includes (1931) an anti-pragmatist, systematic analysis of the fundamental principles of mathematics, physics, biology, psychology and the social sciences, alongside a distinction between science and

pseudoscience, a general theory of scientific inference, a conception of laws of nature, an extended argument for thinking that science is explanatory and an account of scientific explanation.

Our estimate is that (at least) a substantial majority of philosophers of science during the period under consideration, including almost all of those in Table A, were speculative philosophers of science. Further, we estimate that most of the speculative philosophers of science, including twenty two of the twenty-nine listed in Table A (see Table A), did not identify as pragmatists. We have just described a few of the speculative critics of pragmatism. Nevertheless, Deweyan pragmatism, with its insistence that philosophy make substantive empirical and normative claims, was part of the speculative tradition (Katzav 2018, 1198) and also contributed substantially to the stream of early American philosophy of science. Some of the figures we have already discussed, namely Hook and Ratner, combined work on science-informed metaphysics of the speculative variety with a strong Deweyan bent (see, e.g., Hook 1927 and Ratner 1939). Others working in the Deweyan tradition, including Singer Jr. and his student Churchman, developed philosophies of science that aimed to be scientific and that were value-laden (see Krikorian 1962 on Singer Jr.'s views and, e.g., Churchman 1961 on his own views). Such Deweyan philosophers were still within the speculative tradition; while they do not engage in speculative metaphysics, they viewed philosophy as aiming to make substantive, empirical claims about reality that go beyond those of science.

We leave further illustration of the connection between speculative and value-laden philosophy of science to the next section. The great majority of the philosophers we there identify as engaged in value-laden philosophy of science in the 1950s and 1960s were speculative philosophers of science. We can nevertheless already see that, contrary to Edgar, Dewulf, Reisch and Stadler, academic philosophy included, from the early decades of the

twentieth century, a conception of philosophy of science that distinguished it from the study of science found in the sciences and that included a shared theoretical background and shared issues. It is worth adding that pre-1950s philosophy also included models of philosophy of science that could, and indeed appear to, have served as paradigms for further work in the philosophy of science. We offer two examples. *Reason* seems to have served, via its influence on Nagel and sans its speculative components, as a template for much later work in analytic philosophy of science. That Cohen influenced Nagel becomes clear, for example, when we see Nagel first adopt, and then criticize, Cohen's views about logic and mathematics. Cohen argues (1918; 1931) for the view that logic and mathematics are descriptive of certain invariant relations. This view is straightforwardly reiterated in one of Nagel's first papers (1929) and in Cohen and Nagel's joint, 1934 book *An introduction to logic and scientific method*, indicating that Nagel initially adopts his teacher's views. In *Logic without metaphysics* (1954), however, Nagel develops a position that is a response to the kinds of position put forward by Cohen. More importantly, *Reason* reads like a template for Nagel's 1961 book *The structure of science: problems in the logic of scientific explanation* (*Structure*), which became a paradigm within analytic philosophy of science. The critical topics focused on in *Reason*, along with the order in which they are discussed, are mirrored in *Structure*. And while *Reason* is broader in focus than *Structure*, much of *Reason*, like almost the entirety of *Structure*, is concerned with scientific explanation, laws of nature and reduction. Even Nagel's deductive-nomological account of scientific explanation is

closely related to Cohen's view of scientific explanation. Cohen's view (see, e.g., 1931, 102-103) is that explanation in science is deduction from a (certain kind) of system of laws.^{6,7}

Whitehead's work in the philosophy of science is our second instance of an exemplar. His work served, in multiple ways, as a starting point for subsequent work on the synthetic side of speculative philosophy of science. Thus, for example, many speculative philosophers of science took his work on relativity theory as an important starting point for doing metaphysics in a speculative way (see, among others, Northrop 1925, Ushenko 1937, Milič Čapek 1961 and Errol E. Harris 1965). That the project of synthesizing the ontologies of the special sciences could provide avenues for further research is hardly surprising, given the evolving nature of science.

It is important, before moving to the next section, to explain our claim that the philosophers of science under consideration were *professional* philosophers. Creighton, along with Jacob G. Schurman, developed the Sage School of Philosophy after its founding in 1891. The School, run by Creighton, came to provide the model for training philosophers across the United States of America (USA). The School included, from 1892, a philosophy journal, as well as an undergraduate program, a graduate program, a curriculum, colloquia and ties with key philosophers in Great Britain and the USA (Auxier 2005, 550). The journal

⁶ Sander Verhaegh (forthcoming) recognizes Cohen's substantial influence on Nagel but limits it to an influence on Nagel's early philosophy of mathematics and Nagel's naturalism.

⁷ Dewulf (2018) takes the first discussion of the deductive-nomological model to be found in the 1942 work of the logical empiricist Carl G. Hempel and, indeed, supposes that American philosophy of science's discussion of scientific explanation starts with Hempel. As we have seen, Cohen was not the only speculative philosopher of science to discuss scientific explanation before 1940.

in question, *The Philosophical Review* (*PR*), was edited by Creighton (co-editor under Schurman from 1896 and chief editor during 1902-1923) and was run from the outset as a professional journal, one for experts (Schurman 1892; Creighton 1902). It was the first such journal in the USA, joined by *JoP* in 1904. Creighton was also one of the founders of the American Philosophical Association in 1901. Through his editorship of *PR*, Creighton reduced the role of non-academic philosophy in America and played the role of key gatekeeper and setter of standards for American philosophy (Auxier 2005, 551). It is thus in the early decades of the twentieth century that academic, American philosophers came to be educated in standard ways, to publish in a small number of journals dedicated to professional philosophy and to participate in an active professional body. The academic philosophers of science would, as academic philosophers, be part of this wave of professionalization in philosophy. That this is so is borne out by the centrality of publications in *PR* and *JoP* to philosophy of science in the first half of the twentieth century (Table A illustrates this centrality).

An admittedly more tentative hypothesis about the professionalization of philosophy of science is that it was no accident that the early twentieth-century professionalization of philosophy in America coincided with the creation of the sub-field of philosophy of science. For Creighton, philosophy should be philosophy of science. Philosophy should aim, through piecemeal, collaborative investigation, to (a) interpret the methods and concepts of the special sciences, (b) criticize, i.e., exhibit the partial truth of, their presuppositions and (c) use the results of this criticism to develop a systematic vision of reality (Creighton 1912; Katzav forthcoming-b). This vision of the philosophy of science makes metaphysics, conceived of as the systematic account of all experience, a part of the philosophy of science. So too, normative issues are taken to be part of the philosophy of science, partly because the criticism of science should be criticism that aims to present a humanized understanding of humans and

their place in nature (Creighton 1902, 1912). Creighton's way of conceptualizing philosophy of science, accordingly, resembles that found later in American philosophy of science in key ways, including in its distinction between critical and speculative aspects of philosophy of science. Finally, Creighton's conception of philosophy was designed (Auxier 2005; Creighton 1902, 1912) to give philosophy autonomy from religion and from the sciences—especially from psychology, which was then just going its own way—and thus to help secure a place for philosophy in academia. Thus, Creighton's influential drive to professionalize American philosophy in about 1900 also pushes for identifying philosophy with philosophy of science and presents philosophy of science in a way that resembles how it comes to be conceived of later. By implication, the professionalization of American philosophy may, at least through Creighton's influence, have brought with it the professionalization of the philosophy of science. Further support for this conclusion is provided by the observation that, among the philosophers of science writing in the immediately following decades, we find Creighton's students, including, notably, Smart (Annelis 2005), Swabey (Tilly 2005) and the de Lagunas (Katzav forthcoming-b). Moreover, Cohen (1910) explicitly identifies the creation of *PR* with a period in which philosophy comes to be thought of as philosophy of science, argues for the importance of continuing such an identification and, as we have seen, had a role in educating a cohort of philosophers of science.

3. The marginalization of speculative philosophy of science in the 1950s and 1960s

We have seen that there was a tradition of speculative philosophy of science in America during the first half of the twentieth century, one that involved value-laden philosophy of science, that was already well developed before logical empiricists started arriving in America and that continued to exist at least until the 1950s. This means that the institutional pressure which we have elsewhere shown analytic philosophers put on American speculative

philosophy and have shown was at least partially responsible for the decline of such philosophy from the late 1940s (Katzav and Vaesen 2017a, 2017b; Katzav 2018) is likely to have resulted in a decline in speculative philosophy of science during this period, along with a decline in associated value-laden philosophy of science. The pressure will also have impacted that species of speculative philosophy of science that was Deweyan. This overall decline in speculative philosophy of science is to be expected because philosophy of science was part of the wider community of American, professional philosophers. Speculative philosophers of science were trained at the same institutions, published in the same journals and participated in the same key conferences as the broader philosophy community. Conversely, the drive to promote analytic philosophy would have provided support for logical empiricism and, more broadly, for analytic philosophy of science.⁸

Thus, leading journals in the United Kingdom and America make a series of abrupt decisions to cease publishing speculative philosophy despite ongoing speculative work and, instead, more or less solely to publish analytic work. *Mind* and *Analysis* in the United Kingdom were the first journals to do so, with *Mind* doing so in about 1925 (Vaesen and Katzav 2017b) and *Analysis* when it was founded in 1933 (Katzav 2018). The main destinations for American philosophy of science—which, as Table A illustrates, were *The Philosophical Review (PR)*, *The Journal of Philosophy (JoP)* and *PoS*—all follow suit by

⁸ While American logical empiricism is widely recognized as being part of analytic philosophy, not all those associated with logical empiricism fit comfortably into the analytic mold and benefited from the rise of analytic philosophy. This is illustrated by the case of Charles W. Morris, whose attempt to combine logical empiricist and pragmatist perspectives helped to bring about his marginalization (see Reisch 2005, 342 for a discussion of Morris's fate).

1959. *PR* and *JoP* do so in about 1948 and 1958 respectively (Katzav and Vaesen 2017a; Katzav 2018). *PoS* does so in 1959, when Richard Rudner becomes its editor (Howard 2003).⁹ Other avenues for publishing non-analytic, American philosophy of science were extremely limited by 1959. *The Monist* had been a significant destination for speculative philosophy of science during the period 1919-1936, under the editorship of Mary Hegeler Carus (see Table A for some examples), but ceased operation in 1936.¹⁰ Two new journals which might have provided refuge for non-analytic, American philosophy of science were *The Philosophical Quarterly* and *Philosophical Studies*. But the former, which was founded in 1950, ceased to publish non-analytic work before 1959 and the latter, which was founded in 1950 by the logical empiricist Herbert Feigl and by the analytic philosopher Wilfred Sellars, was dedicated solely to analytic philosophy from the outset (Katzav 2018). *Philosophy and Phenomenological Research* and *The Review of Metaphysics* were the only generalist journals in America which might have been open to non-analytic philosophy of science and they were shared by analytic and non-analytic work (see Table 1 in Katzav 2018). Further pressure on non-analytic philosophy and support for analytic philosophy came from the fact that key PhD awarding philosophy departments came to be controlled by analytic philosophers during the late 1940s and the 1950s. Such departments include, among

⁹ Rudner was committed to the view that philosophy of science is solely focused on the logical analysis of justification and thus rejected the acceptability of value-laden philosophy of science (Vaesen and Katzav 2019).

¹⁰ Prior to 1919, *The Monist* was under the editorship of Paul Carus and then focused almost entirely on publishing work by scientists and Europe-based philosophers. As a result, it was not at the time an important destination for American, professional philosophy.

others, the Sage School of Philosophy at Cornell University and the philosophy departments at UCLA and Harvard (Katzav 2018, 1211).

Our story here is also supported by our (2019) argument that the decline of value-laden philosophy of science was, at least in part, brought about by the marginalization of value-laden work in the philosophy of science by logical empiricists. By the late 1950s, logical empiricists had important positions as advisors in the National Science Foundation's (NSF) History and Philosophy of Science (HPS) funding division. These advisors funded almost no value-laden philosophy of science in the late 1950s and early 1960s. The result was that logical empiricism was supported, since it did not at the time engage in value-laden work, while those philosophers of science who were engaged in value-laden work were at a disadvantage. Given the association of value-laden philosophy of science with speculative philosophy of science, American logical empiricism's analytic orientation as well as its general opposition to philosophy that aims to make claims about reality that go beyond those of science,¹¹ the actions of NSF logical empiricists are to be expected. Indeed, two of the logical empiricists who acted as NSF advisors at the time, Max Black and Sidney Morgenbesser, were involved in marginalizing speculative philosophy elsewhere. Black participated in marginalizing non-analytic philosophy at *PR* (Katzav and Vasen 2017a) while Sidney Morgenbesser did the same at *JoP* (Katzav 2018).

¹¹ The literature does not, as far as we know, contest the claim that American logical empiricism opposed this speculative goal. Nevertheless, the next section supports the claim that the NSF logical empiricists identified philosophy with logical analysis and thus opposed speculative philosophy.

The dominance of analytic philosophy of science from the 1960s and beyond is thus plausibly explained, at least in part, by the control by analytic philosophers of key academic institutions. Our observation that NSF funding was used to marginalize value-laden philosophy of science also does so. Note, however, that perusal of the contents of prominent journals and anthologies during this period is likely to some extent to mask how much speculative and value-laden philosophy of science was being done in America. The decisions to stop publishing speculative philosophy of science were far too abrupt to coincide with the cessation of such work; indeed, section 4 shows that such work was still being done in the 1950s and 1960s.

Ronald N. Giere suggests two other candidate, partial explanations for the dominance of logical empiricism, namely that by the 1950s pragmatism had ceased to be a fruitful research program in the philosophy of science as well as that, for some reason, pragmatists had failed to recruit and place sufficient philosophers (1996, 348-349). The force of these potential explanations is substantially blunted by our estimate that pragmatists were a minority among speculative philosophers of science. Further, we have seen that the issues that came to dominate analytic philosophy of science were already an integral part of pre-logical empiricist philosophy of science and that, in addition, the speculative component of this philosophy of science seems to have provided ample room for further research. It is thus not straightforward to see what advantage logical empiricist research programs might have had. That pragmatists were not recruiting and placing sufficiently many philosophers is, nevertheless, what one should expect if our institutional marginalization story is correct.

A second potential explanation for the rise of logical empiricism is that logical empiricism disengaged from societal and political concerns by the 1950s and thus, unlike pragmatism, was well placed to thrive when conservatives were putting political pressure on

the left during the McCarthy era (McCumber 2001; Reisch 2005). We accept that this too may have been a factor in the decline of speculative philosophy of science, especially given that speculative philosophy of science was intimately tied to value-laden projects. In line with our earlier work (2019, 74), however, we note that these pressures were not decisive. This is seen in that *JoP* was publishing substantial quantities of speculative, including pragmatist, philosophy until the end of the 1950s (Katzav 2018; Vaesen and Katzav 2019) and that value-laden philosophy of science continued to be done in the 1950s and 1960s.

It has, third, been argued that a key aspect of the professionalization of philosophy of science was a factor in explaining the decline of value-laden philosophy of science. Recall that Edgar and Dewulf claim that philosophy of science only became a sub-field with its own theoretical framework—the logical empiricist one—in the second half of the twentieth century. They take this adoption to be a stage in the professionalization of philosophy of science. According to Edgar, further, the adoption provided the standards for determining who belonged to the field and, because of its identification of philosophy of science with the logical analysis of science, was inherently opposed to value-laden philosophy of science. Thus, a stage in the professionalization of philosophy of science is supposed to explain the exclusion of value-laden philosophy of science from the discipline (2009, 185-187). While Dewulf does not think that logical empiricists had in-principle objections to value-laden philosophy of science, he does think that there happened to be few of them who were interested in value-laden work in the late 1950s and in the 1960s, when they were using their theoretical framework to create the field. Professional philosophers of science were simply not engaged in value-laden philosophy of science in the 1950s (2021, 941, 947-949). Howard (2003, 71-73) and Giere (1996) make similar suggestions to these, though they do so in a more tentative way.

We have, however, seen that academic philosophy of science had already been distinguished from the special sciences which were studying science, as well as from the other sub-disciplines in philosophy, during the early decades of the twentieth century. The distinction was made with the help of the speculative theoretical background and the issues associated with this background as well as, at least when it comes to the science-philosophy nexus, by the development of the institutions of academic philosophy. Thus, it cannot be the aspects of professionalization pointed to by Edgar and Dewulf, namely the acquisition of a shared theoretical background and set of issues, that explain the withdrawal of philosophy of science from social concerns. Similarly, these aspects cannot help to explain the withdrawal from speculative concerns. Other aspects of professionalization, such as the shifting of *PoS*'s focus solely to work by philosophers (Dewulf 2021) and the creation of institutes for the philosophy of science (Stadler 2007), did go along with the growing dominance of logical empiricist and analytic philosophy of science. This fits with our proposal that success at gaining control of key institutions by analytic philosophers is what drove the changes within the philosophy of science.

Finally, it has been suggested (e.g., Soames 2008 and Misak 2013) that the affinities between philosophy in America and the work that was being done by the immigrant logical empiricists, for example, a widely shared empiricist orientation, helps to explain the success of logical empiricism and of analytic philosophy. Further, on this suggestion, there was no fundamental disagreement between the logical empiricists and American philosophy. Our story agrees that American and immigrant, logical empiricist philosophy of science were concerned with many common issues. Indeed, to some extent at least, logical empiricist and subsequent analytic philosophy of science took on board issues initially worked on by speculative philosophers. At the same time, our story makes clear that there was a

fundamental divide between early American philosophy of science and what the logical empiricist immigrants brought with them.

4. Philosophy of science in the 1950s and logical empiricist opposition to value-laden philosophy of science

In responding to our argument (2019) that value-laden philosophy of science was marginalized by logical empiricists at the NSF in the late 1950s and early 1960s, Dewulf claims (2021, 941) that, by the 1950s, there was no community of philosophers of science who were engaged in value-laden work and thus were potential targets for marginalization because of such engagement. This claim is in tension with the story we have told above. On that story, there should still be philosophers engaged in value-laden philosophy of science in the 1950s. Indeed, our view is that the process of marginalization of speculative philosophy of science was an extended one that continued into the 1960s. We, accordingly, rebut Dewulf's claim here and support our argument from 2019.

Dewulf supports his claim about the absence of value-laden philosophers of science by examining our 2019 list of philosophers who were producing value-laden philosophy of science in the 1950s and 1960s. He argues that, on inspection, it turns out that only four of the eighteen listed were philosophers of science and that, of these, only one, Miller, was marginalized; but there is no evidence that he was engaged in value-laden philosophy of science, according to Dewulf (2021, 940-941). Our 2019 list, however, is not a list of philosophers of science. Rather, the list (2019, 77) is a list of philosophers who did at least some value-laden philosophy of science and could have, but did not, receive NSF funding. Such a list makes sense since some of those who received funding, e.g., Abraham Edel and Gregory Vlastos (Table 1 in Vaesen and Katzav 2019) were not philosophers of science and

since value-laden philosophy of science was sometimes done by those interested in an empirical investigation of norms or in a scientific ethics but were not philosophers of science. Edel was one such philosopher. The other philosophers we listed who are similar to Edel in terms of their interests but do not receive funding are Sidney Axinn, Jack Kaminsky, Gail Kennedy, Paul W. Kurtz, Charles Morris, Dale Riepe, Ralph G. Ross and Ralph W. Sleeper.

Moreover, there were many philosophers of science who were producing value-laden philosophy of science in the 1950s and 1960s. As an indication of this, consider Table B in the appendix. Table B includes a list of sixteen books (highlighted in blue) which were published during the period 1953-1967 and which include value-laden philosophy of science. Some of the books' authors already appear in Table A and all of them share, with the others from table A, having the philosophy of science as a primary, or as a sole, area of research. All things being equal, each of these books represents a project that might have benefited from NSF funding.

Table B complements our earlier 2019 list with ten authors: Churchman, Conger, Feibleman, Kattsoff, Kuhn¹², Lowe, Northrop, Pepper, Reiser and Werkmeister. The table also includes six authors who are on Vaesen and Katzav's list but who Dewulf does not discuss, mistakenly does not classify as philosophers of science or mistakenly dismisses as irrelevant despite recognizing that they were philosophers of science: Benjamin, Handy, Harris¹³, Feuer, Hook and Miller.

¹² As we noted in our 2019, Kuhn became an NSF advisor in 1970.

¹³ Harris was originally from South-Africa but moved to the U.S. in 1956. He worked there until his death (except for the years 1959-1960, when he was affiliated with Edinburgh

The primary focus of *Benjamin* (not discussed by Dewulf) over many decades was the philosophy of science, including speculative philosophy of science, and Benjamin did produce a substantive body of value-laden work (see Tables A and B). *Handy* (not recognized by Dewulf as a philosopher of science) is dismissed (2021, 940) as irrelevant on the grounds that, other than one paper which he publishes in *PoS*, namely ‘Personality factors and intellectual production’ (1956), his work was on other topics and was not integrated with, or even cited by, other work in the philosophy of science at the time. Handy, however, publishes four books in the philosophy of science in the decade following the already highlighted book from Table B; issues concerning values in science are an ongoing theme of his books (see again Table B). Moreover, he publishes a second paper in *PoS*, namely ‘Philosophy’s neglect of the social sciences’ (1958), in which he situates his work in relation to others who were doing value-laden philosophy of science, including, from among those listed in Table B, Feuer, Kattsoff and Northrop but also others discussed by Vaesen and Katzav (2019), e.g., Edel, Kurtz and Paul W. Schmidt, and others not discussed by Vaesen and Katzav, e.g., the African American, speculative philosopher of science Golightly (see Table A). Handy’s paper, and other work by him, is cited in the literature, e.g., a Google Scholar search brings up thirty-two pre-1980 citations of his 1964 book. Handy belonged to the Deweyan side of philosophy of science (Handy and Kurtz 1964). *Harris* (not recognized by Dewulf as a philosopher of science) publishes at least three books in the philosophy of science and had value-laden philosophy of science as an ongoing area of research (see Table B). Moreover, there is some discussion of his work in the philosophy of science by other philosophers of science in the 1960s and 1970s; they recognize Harris as a philosopher of science (see, e.g.,

University). Harris was, accordingly, a candidate for NSF funding during the period we were concerned with in our earlier study.

Brown 1972; Kisiel and Johnson 1974; McMullin 1966). Harris belongs to the tradition of speculative philosophy of science that engaged in systematic metaphysics, particularly strongly reflects the influence of Hegel, Bergson and Whitehead, and spends decades defending this tradition and criticizing analytic philosophy, including logical empiricism (see, e.g., his 1954 and 1965).

There remain the philosophers Dewulf takes to be irrelevant despite recognizing that they were philosophers of science. Dewulf states that *Feuer* was not—because his work did not appear in anthologies from the 1960s—representative of philosophy of science in the 1950s, that *Hook* was no longer working in the philosophy of science by the end of the 1950s and that *Miller* was not working in value-laden philosophy of science (2021, 941). But whether Feuer’s work was included in anthologies is irrelevant to our concerns in this section; Feuer was still a philosopher of science who did value-laden philosophy of science. Miller, in turn, does have a standing interest in value-laden philosophy of science, something illustrated by the 1959 book on science and human freedom (Table B). And, contrary to Dewulf, Hook continues to publish work in the philosophy of science in the late 1950s and early 1960s (see his four 1959 papers and his 1963 paper listed in Table B).

We emphasize that, despite the substantial interest in value-laden philosophy of science in the 1950s and 1960s, we are not arguing that such philosophy was strong at the time. There was comparatively limited discussion of value-laden philosophy of science. Moreover, proponents of value-laden philosophy of science did not set up their own journal once *PoS* ceased to publish such philosophy, become central in running the Philosophy of Science Association or set up their own alternative to it. This fits well with the story of the marginalization of speculative philosophy of science. Nevertheless, as we argued in 2019, value-laden philosophy of science was being produced in the 1950s and 1960s by many

philosophers and thus was a potential target for marginalization by logical empiricists at the NSF.

Dewulf, in addition to his claim about the dearth of value-laden philosophy of science, makes a second claim that should be considered here. According to our 2019 paper, Hans Reichenbach provided the philosophical framework within which logical empiricists came to work in the 1950s and this framework excluded value-laden philosophy of science from philosophy of science (2019, 74). According to Dewulf, however, Reichenbach had no objection to value-laden philosophy of science. Moreover, the same is supposed to be true of those philosophers of science making decisions about NSF funding, namely Nagel, Black, Morgenbesser, Grover Maxwell and Wesley Salmon (2021, 939). If Dewulf is correct, it might be thought that the marginalization of value-laden philosophy of science at the NSF was not due to any in-principle objection to it but rather because of its association with speculative philosophy of science.

Nevertheless, during the period under consideration, Reichenbach and those operating at the NSF explicitly identify philosophy of science with logical analysis and thus would object to value-laden philosophy of science's empirical and normative orientation. Reichenbach writes that "[p]hilosophy does not contribute any content to knowledge; it merely studies the form of knowledge as exhibited in the work of the scientist and examines all claims to validity" (1948, 345). Nagel's view that philosophy should focus on logical analysis has already been noted above. Black describes himself as a conceptual analyst (1985) and, in response to the thought that there might be more to philosophy than clarification, writes that "it will be time enough to worry about that when clarity is generally valued more highly than mystification" (1950, v). Morgenbesser is explicit that the philosophy of science is about analysis (Vaesen and Katzav 2019, p.76). Salmon characterizes himself as carrying out the legacy of his teacher, Reichenbach (Vaesen and Katzav 2019, p.77). When enumerating core

and non-core areas of philosophy of science (1999), Salmon nowhere comes near to suggesting that value-laden topics are part of it. Maxwell, whose career starts in the late 1950s, writes, in 1976, that he used to think that philosophical statements “can only be about linguistic, conceptual or logical matters” (1976, 332).

Dewulf does offer, from unpublished sources, statements by Reichenbach and Nagel that suggest that philosophy of science should be concerned with the relations between science and society. But these statements are not explicit that philosophers themselves may engage in empirical or normative work. Thus, Dewulf cites a letter from Reichenbach to the NSF director Raymond Seeger in support of the claim that Reichenbach had no objection to value-laden philosophy (2021, 937). According to Dewulf, Reichenbach’s letter describes what is important to the field philosophy of science and implies that “[t]he relations between science and society, including applications to education and ethics, belong to philosophy of science” (937). Reichenbach writes, regarding a possible NSF philosophy of science division,

[t]he work of this division I would outline as follows:

- 1) Logical analysis of science. Clarification of scientific concepts; studies in scientific methodology; research in mathematical logic and its application to the sciences, to linguistics, to engineering problems; training of scientists in logic and methodology.
- 2) Relations between science and society. Studies concerning the impact of science on social structure and its influence on human relations. Applications to education and social ethics; training of scientists in transferring their methods to the social field. (Reichenbach 1925)

Reichenbach's statement, however, is about the work of the division rather than that of philosophers as such and thus is unclear about what it implies about philosophy as such. The statement is, for example, compatible with the view that those funded by the proposed division who would engage in empirical, value-laden work and its applications would be social scientists rather than philosophers. Indeed, as Dewulf notes, Reichenbach envisages philosophers of science as working at institutions that engage in cooperative work with such scientists (2021, 937). In light of this, and of Reichenbach's public statements about what philosophy is, it seems plausible that Reichenbach was opposed to value-laden philosophy of science.

Similarly, Dewulf notes that, in the introductions to his philosophy of science courses, Ernest Nagel included the relations between science and society within the purview of philosophy of science (2021, 939). Nagel, however, does the same in some of his published work, but there also, as we have noted, makes clear that philosophers of science will still be concerned solely with logical analysis; their interest is in logical relations between ideas in science and society (Nagel 1954, 297-298).

In any case, it is agreed that none of the logical empiricists we have been discussing publishes their own value-laden philosophy of science, develops a framework for such research or even publicly supports such research in print during the period under consideration. Nor, given the opposition to speculative philosophy, would they have accepted such work as it was actually carried out by speculative philosophers. Indeed, the funding pattern at the NSF indicates a lack of such support. Thus, even if we accept that NSF logical empiricists would, in principle, permit work in value-laden philosophy of science, such permission would have to be supposed to be for some as yet unarticulated future program in the field. This is a long way from a willingness to support the value-laden work that was actually being done in the 1950s or 1960s. In sum, it seems that we were, in 2019, correct in

asserting that although there were many philosophers doing value-laden philosophy of science who might have benefited from NSF funding, very few did so and that a plausible explanation for this is that it is partly due to an (in-principle or, at least, de facto) opposition to value-laden philosophy of science.

5. Conclusion

We have seen that, contrary to a number of prominent histories, philosophy of science was already a sub-discipline of American academic philosophy well before 1950, one that was predominantly speculative and had value-laden philosophy of science as an important ingredient. This tradition already dealt with the key issues that came to dominate analytic philosophy of science before logical empiricism had an impact in America. At least part of the reason for the rise of logical empiricist philosophy of science from the late 1940s was the marginalization of the earlier tradition of American philosophy of science by logical empiricists and by the broader community of analytic philosophers along with the promotion of analytic philosophy. This marginalization occurred partly because of the opposition to speculative philosophy that was widespread among American analytic philosophers. The marginalization also occurred because of the opposition to value-laden philosophy of science as it was actually done at the time if not due to in-principle objections to value-laden philosophy.

Appendix

Table A: American philosophers of science active prior to 1950 and a selected list of their publications in the philosophy of science. [B] indicates the publication is a book.

Journal names are indicated in abbreviated form using the abbreviations from the body of the text, with the addition of *PPR* for *Philosophy and Phenomenological Research*. ‘pragmatism’ indicates school affiliation.

Abram Cornelius Benjamin

- Science – existential and non-existential (*PR* 1927)
- On the formation of constructs (*The Monist* 1928)
- The logical structure of science (1936) [B]
- Science and the philosophy of science (*PoS* 1938)
- An introduction to the philosophy of science (1937) [B]

Edwin A. Burt

- The metaphysical foundations of modern science (1924) [B]
- Principles and problems of right thinking (1928) [B]

Charles West Churchman (pragmatism)

- Elements of logic and formal science (1940) [B]
- Philosophical aspects of statistical theory (*PR* 1946)
- Ethics and science (*PoS* 1947)

Morris R. Cohen

- The subject matter of formal logic (*JoP* 1918)
- Mechanism and causality in physics (*JoP* 1918)
- Reason and nature: an essay on the meaning of scientific method (1931) [B]
- An introduction to logic and scientific method (with Ernest Nagel, 1934) [B]

George P. Conger

- New views of evolution (1929) [B]
- A world of epitomizations: a study in the philosophy of the sciences (1931) [B]

- The horizons of thought (1933) [B]
- Epitomization: a study in philosophy of the sciences (1949) [B]

Grace A. de Laguna

- Dogmatism and evolution (with Theodore de Laguna, 1910) [B]
- The limits of the physical (1917)
- Phenomena and their determination (*PR* 1917)
- Appearance and orientation (*JoP* 1934)
- Cultural relativism and science (*PR* 1942)

Theodore A. de Laguna

- The postulates of deductive logic (*JoP* 1915)
- The sociological method of Durkheim (*PR* 1920)
- The nature of space – I and II (*JoP* 1922)
- The factors of social evolution (1926) [B]

John Dewey (pragmatism)

- Experience and nature (1925) [B]
- Logic: the theory of inquiry (1938) [B]
- Knowing and Known (with Arthur F. Bentley, 1949) [B]

Ray H. Dotterer

- Science as symbol and as description (*JoP* 1926)
- Philosophy by way of the sciences (1929) [B]
- Indeterminisms (*PoS* 1938)
- Ignorance and equal probability (*PoS* 1941)

Lewis S. Feuer

- The development of logical empiricism (*Science and Society* 1941)

- Metaphysics and social science (*Science and Society* 1945)
- Mechanism, physicalism, and the unity of science (*PPR* 1949)
- Dialectical materialism and Soviet science (*PoS* 1949)

Cornelius L. Golightly

- Social science and normative ethics (*JoP* 1947)
- 8 Case Studies in the Psychopathology of Crime. Vol. III: Cases 10-13 (*Ethics* 1949)
- Inquiry and Whitehead's schematic method (*PPR* 1950)

Sidney Hook (pragmatism)

- The metaphysics of pragmatism (1927) [B]
- Reason and nature: the metaphysics of the scientific method (*JoP* 1932)
- Dialectic in social and historical inquiry (*JoP* 1939)
- Reason, social myths and democracy (1940) [B]
- The hero in history (1943) [B]

Louis O. Kattsoff

- Postulational methods – I, II and III (*PoS* 1935-6)
- Observation and interpretation in science (*PR* 1947)
- A philosophy of mathematics (1948) [B]
- The role of hypothesis in scientific investigation (*Mind* 1949)

Thelma Z. Lavine (pragmatism)

- Sociological analysis of cognitive norms (*JoP* 1942)
- Naturalism and the sociological analysis of knowledge (1944)
- Knowledge as interpretation: an historical survey I and II (*PPR* 1950)

David L. Miller

- Emergent evolution and the scientific method (1935) [B]
- The philosophy of A. N. Whitehead (with George V. Gentry, 1938) [B]
- Science, technology and value judgments (*Ethics* 1947)

Ernest Nagel

- Nature and convention (*JoP* 1929)
- On the logic of measurement (1931) [B]
- Verifiability, truth and verification (*JoP* 1934)

Filmer S. C. Northrop

- Relativity and the relation of science to philosophy (*The Monist* 1925)
- Science and first principles (1931) [B]
- Causality in field physics in its bearing upon biological causation (*PoS* 1938)
- The logic of the sciences and the humanities (1947) [B]
- Ideological differences and world order: studies in the philosophy and science of the world's cultures (1949) [B]

Stephen C. Pepper

- The nature of scientific matter (*JoP* 1917)
- Misconceptions regarding behaviourism (*JoP* 1923)
- Emergence (*JoP* 1926)
- The quest for ignorance or the reasonable limits of skepticism (*PR* 1936)
- World hypotheses: a study in evidence (1942) [B]

Albert G. Ramsperger

- Logic and laws of nature (*JoP* 1937)
- What is scientific knowledge? (*PoS* 1939)
- Philosophies of science (1942) [B]

Joseph Ratner (pragmatism)

- De-moralizing Freud (*JoP* 1924)
- Scientific objects and empirical things (*JoP* 1935)
- Science as history (*JoP* 1937)
- Intelligence in the modern world: John Dewey's philosophy (work by John Dewey, edited with a book-length introduction by Ratner, 1939) [B]
- Dewey's contribution to historical theory (1950)

Oliver L. Reiser

- The problem of time in science and philosophy (*PR* 1926)
- Relativity and reality (*The Monist* 1931)
- The promise of scientific humanism: toward a unification of scientific, religious, social and economic thought (1940) [B]
- An institute for scientific humanism (*PoS* 1945)

Roy Wood Sellars

- Evolutionary naturalism (1922) [B]
- The philosophy of physical realism (1932) [B]

Edgar A. Singer Jr. (pragmatism)

- Note on the Physical World-Order. I, II (*JoP* 1904)
- On mechanical explanation (*PR* 1904)
- Mind as behavior and studies in empirical idealism (1924) [B]
- Beyond mechanism and vitalism (*PoS* 1934)
- Mechanism, vitalism, naturalism (*PoS* 1946)

Harold R. Smart

- The philosophical presuppositions of mathematical logic (1925) [B]

- Is mathematics a ‘deductive’ science? (*PR* 1929)
- The logic of science (1931) [B]
- An introductory logic (revision of James Edwin Creighton, 1932) [B]
- Cassirer versus Russell (*PoS* 1943)

Marie T. C. Swabey

- Some modern conceptions of natural law (1920) [B]
- *Substance and Function* and *Einstein’s Theory of Relativity* (trans. with William Curtis Swabey from E. Cassirer, 1923) [B]
- Science and subjectivity (*The Monist* 1927)
- Logic and nature (1930 & 1957) [B]

Andrew Ushenko

- The logic of events: an introduction to a philosophy of time (1929) [B]
- Infinity and indefiniteness (*The Monist* 1930)
- The theory of logic: an introductory text (1936) [B]
- The philosophy of relativity (1937) [B]
- Power and events: an essay on dynamics in philosophy (1946) [B]

William Werkmeister

- Seven theses of logical positivism critically examined I, II (*PR* 1937)
- A philosophy of science (1940) [B]
- The basis and structure of knowledge (1948) [B]

Alfred N. Whitehead

- Science and the modern world (1925) [(B)]
- Process and reality (1929) [B]
- Adventures of ideas (1933) [B]

<ul style="list-style-type: none"> • Nature and life (1934) [B]
<p>Philip P. Wiener (pragmatism)</p> <ul style="list-style-type: none"> • Some metaphysical assumptions and problems of neo-positivism (<i>JoP</i> 1935) • Philosophical, scientific, and ordinary language (<i>JoP</i> 1948) • Evolution and the founders of pragmatism (1949) [B]

Table B: American value-laden philosophy of science (1953 to 1967). Selected publications of authors. Key value-laden work is highlighted and characterized in blue.

<p>Abram Cornelius Benjamin</p> <ul style="list-style-type: none"> • Some theories of the development of science (1953) • Is the philosophy of science scientific? (1960) • Science, technology and human values (1965) [B] <p>A critique of logical empiricist positions as well as an examination of the relations between scientific and non-scientific fields, of the cultural aspects of science and of the role of values in science</p>
<p>George P. Conger</p> <ul style="list-style-type: none"> • Synoptic naturalism (1960) <p>Sketches a picture of the universe, including of the evolution of society, and draws normative conclusions from this, by studying all the sciences, including the social sciences (revised version of his 1931 book from table A)</p>
<p>Charles West Churchman</p> <ul style="list-style-type: none"> • A critique of scientific critiques (1953) • Science and decision making (1956)

- **Prediction and optimal decision: philosophical issues of a science of values (1961)**

[B]

Takes a first step in developing a science of science by investigating the methodological problems in determining what humans' values, including those of science, are

James K. Feibleman

- Inside the great mirror: a critical examination of Russell, Wittgenstein and their followers (1958) [B]
- The psychology of the scientist (1960)
- **Foundations of empiricism (1962) [B]**
Proposes a systematic, science-informed metaphysics and uses it as a basis for an ethics
- The impact of science on society (1962)
- The human future from scientific findings (1968)

Lewis S. Feuer

- Psychoanalysis and ethics (1955) [B]
- The principle of simplicity (1957)
- **The scientific intellectual: the psychological & sociological origins of modern science (1963) [B]**

Criticizes Merton's view that the protestant ethic had a decisive positive influence on the development of modern science, proposes that a hedonistic-libertarian ethic was and uses this proposal to critique American science

Rollo L. Handy

- The naturalistic reduction of ethics to science (1956)

- Methodology of the behavioral sciences: problems and controversies (1964) [B]

- **A current appraisal of the behavioral sciences** (with Paul Kurtz, 1964) [B]

Catalogues developments in the behavioral sciences and, inspired by John Dewey and Arthur F. Bentley, suggests a direction that might permit a synthesis. Section 7 focuses on preferential behavior and supports and provides advice about the scientific investigation of values.

- Value theory and the behavioral sciences (1969) [B]
- The measurement of values: behavioral science and philosophical approaches (1970) [B]
- Useful procedures of inquiry (with Edward C. Harwood, 1973) [B]

Errol E. Harris

- Scientific philosophy (1952)
- Objectivity and reason (1955)
- Nature, mind and modern science (1954) [B]
- **The foundations of metaphysics in science** (1965) [B]

Aims to determine the precise character and significance, including the purpose, of the scientific age through a systematization of the results of the special sciences

- Hypothesis and perception: the roots of scientific method (1970) [B]

Sidney Hook

- **Marx and the Marxists: the ambiguous legacy** (1955) [B]

A critical evaluation of developments in Marxist political theory.¹⁴

¹⁴ At least until Rudner took over the editorship of *PoS* (in 1959) and banned them, engagements with Marxist political theory were within the scope of the philosophy of

- Naturalism and first principles (1956)
- Necessity, indeterminism and sentimentalism (1958)
- John Dewey—philosopher of growth (1959)
- Man and nature: some questions for Mr. Mitin (1959)
- Science and mythology in psychoanalysis (1959)
- Science and human wisdom (1959)
- Objectivity and reconstruction in history (1963)

Louis O. Kattsoff

- **The design of human behavior** (1953) [B]
An examination of the role of values in the social sciences.
- Logic and the nature of reality (1956) [B]
- Physical science and physical reality (1957) [B]

Thomas S. Kuhn

- **The structure of scientific revolutions** (1962) [B]
An essay in the history and philosophy of normal and revolutionary science, including of the role of societal factors in paradigm choice.

Victor Lowe

- Whitehead and the modern world: science, metaphysics and civilization (1950) [B]
- **Understanding Whitehead** (1962) [B]
An exposition of Whitehead's system, including of his metaphysics, his philosophy of science, his philosophy of value and how these interrelate

science. As Howard (2003) and Vaesen and Katzav (2019) point out, before Rudner's editorship, *PoS* regularly published articles on Marxist thought.

David L. Miller

- The importance of presents in contemporary science (1957)
- Sinnott's philosophy of purpose (1958)
- Recent speculations in the positivistic movement (1959)
- **Modern science and human freedom (1959) [B]**

An evolutionary and social science-based argument for free will, one that considers the relationship between freedom and norms and the possibility of a science of norms

- The function of pasts in science (1965)

Filmer S. C. Northrop

- The complexity of legal and ethical experience: studies in the method of normative subjects (1959) [B]
- **Philosophical anthropology and practical politics (1960) [B]**

Uses the results of the natural and social sciences to develop a theory of humans and nations. Applies this theory to describe and address political problems

Stephen C. Pepper

- **The sources of value (1958) [B]**

An appeal to results from the various sciences, including the social sciences, in order to support a naturalistic, utilitarian theory of values

- A proposal for a world hypothesis (1963)
- Concept and quality: a world hypothesis (1967) [B]

Oliver L. Reiser

- The evolution of cosmologies (1952)
- Postulates for an ethics of belief in science, religion and philosophy (1956)
- The integration of human knowledge (1958) [B]

- **Man's new image of man** (1961) [B]

Defends a scientific humanism and the need for an associated cosmology

William H. Werkmeister

- An empirical approach to value theory (1955)
- Theories of ethics (1961) [B]
- Reflections on the possibilities of metaphysics (1964)
- **Man and his values** (1967) [B]

Develops a theory of values and value standards that is informed by empirical, including scientific, investigation

Bibliography

Andrus, G. 1899. "Mind and motion", Grace A. de Laguna Papers, Special Collections Department, Bryn Mawr College Library.

Annelis, I. H. 2005. "Smart, Harold Robert." In *The dictionary of modern American philosophers*, ed. J. R. Shook, 2241-2242. Bristol: Thoemmes.

Auxier, R. A. 2005. "Creighton, James Edwin." In *The dictionary of modern American philosophers*, ed. J. R. Shook, 549-554. Bristol: Thoemmes.

Benjamin, A. C. 1936. *The logical structure of science*. London: Kegan Paul, Trench, Trubner and Co.

---1937. *An Introduction to the Philosophy of Science*. New York: The Macmillan Company.

Brightman, E. S. 1947. "Philosophy in the United States 1939–1945," *The Philosophical Review*, 56(4): 390-405.

Black, M. 1950. "Preface." In M. Black (ed.), *Philosophical analysis: A collection of essays*. Englewood Cliffs: Prentice Hall Inc.

----1985. "The articulation of concepts." In *Philosophers on their own work*, vol. 12, ed. André Mercier and Maja Svilar, 9-41. Bern: Verlag Peter Lang.

Brown, H. I. 1972. "Harris on the logic of science," *Dialectica*, 26(3/4): 227-246.

Čapek, M. 1961. *The philosophical impact of contemporary physics*. Princeton: Van Nostrand.

Churchman, C. W. 1961. *Prediction and optimal decision: philosophical issues of a science of values*. Englewood Cliff, N. J.: Prentice-Hall.

Cohen, M. R. 1910. "The Conception of Philosophy in Recent Discussion," *The Journal of Philosophy*, 7(15): 401-410.

----1918. "The subject matter of formal logic," *The Journal of Philosophy*, 15(25): 673-688.

----1927. "Concepts and Twilight Zones," *The Journal of Philosophy*, 24(25): 673-683.

----1931. *Reason and nature: an essay on the meaning of scientific method*. Glencoe, Ill.: The Free Press.

Cohen, M. R. and Nagel, E. 1934. *An introduction to logic and the scientific method*. London: Routledge and Kegan Paul Ltd.

Collins, J. 1950. "A quarter century of American philosophy," *The Schoolman*, 25(1): 46-80.

Creighton, J. E. 1902. "The Purposes of a Philosophical Association," *The Philosophical Review*, 7(3): 219-237.

----1912. "The determination of the real," *The Philosophical Review*, 21(3): 301-321.

De Laguna, G. A. 1917a. "Phenomena and their determination," *The Journal of Philosophy*, 26(6): 622-633.

De Laguna, G. A. 1917b. "The limits of the physical." In *Essays in honour of James Edwin Creighton by former students*, ed. Sabine, G. H., 175-184. New York: The MacMillan Company.

---1927. *Speech: Its Function and Development*. New Haven: Yale University Press.

De Laguna, T. 1926. *The factors of social evolution*. New York: F. S. Crofts Ltd.

De Laguna, T. and de Laguna, G. 1910. *Dogmatism and Evolution: studies in modern philosophy*. New York: The MacMillan Company.

Delaney, C. F. 2005. "Cohen, Morris Raphael." In *The dictionary of modern American philosophers*, ed. J. R. Shook, 516-518. Bristol: Thoemmes.

Dewulf, F. 2018. "Revisiting Hempel's 1942 contribution to philosophy of history," *Journal of the History of Ideas*, 79(3): 385-406.

---2021. "The institutional stabilization of philosophy of science and its withdrawal from social concerns after the Second World War," *British Journal for the History of Philosophy*, 29(5): 935-953.

Douglas, H. 2009. "Philosophy of science, political engagement, and the cold war: an introduction," *Science & Education*, 18: 157-160.

Edgar, S. 2009. "Logical empiricism, politics, and professionalism," *Science & Education*, 18: 177-189.

Giere, R. N. 1996. "From Wissenschaftliche Philosophie to philosophy of science." In *Origins of logical empiricism* (Minnesota Studies in the Philosophy of Science, vol. XVI), ed.

R. N. Giere and A. Richardson, 335-354. Minneapolis/London: University of Minnesota Press.

Harris, E. E. 1954. *Nature, mind and modern science*. London: George Allen and Unwin.

----1965. *The foundations of metaphysics in science*. London: George Allen and Unwin.

Handy, R. 1956. "Personality Factors and Intellectual Production," *Philosophy of Science*, 23(4): 325-332.

----1958. "Philosophy's Neglect of the Social Sciences," *Philosophy of Science*, 25(2): 117-124.

Handy, R., Kurtz, P. 1964. *A Current Appraisal of the Behavioral Sciences*. Great Barrington: Behavioral Research Council.

Hook, S. 1927. *The metaphysics of pragmatism*. Chicago: Open Court Pub. Co.

Howard, D. 2003. "Two left turns make a right: On the curious political career of North American philosophy of science at mid-century." In G. Hardcastle, & A. Richardson (ed.), *Logical empiricism in North America*, 25–93. Minneapolis: University of Minnesota Press.

Katzav, J. 2018. "Analytic philosophy, 1925–69: emergence, management and nature," *British Journal for the History of Philosophy*, 26(6): 1197-1221.

----forthcoming-a. "Grace de Laguna's analytic and speculative philosophy," *Australasian Philosophical Review*.

----forthcoming-b. "The de Lagunas' Dogmatism and Evolution, overcoming modern philosophy and making post-Quinean analytic philosophy." In E. Schliesser ed., *Neglected Classics of Philosophy*. Oxford: Oxford University Press.

- Katzav, J. and Vaesen, K. 2017a. "On the emergence of American analytic philosophy," *British Journal for the History of Philosophy*, 25: 772-798.
- Katzav, J. and Vaesen, K. 2017b. "Pluralism and peer review in philosophy," *Philosophers' Imprint*, 17 (19): 1-20.
- Kisiel, T. and Johnson, G. 1974. "Philosophies of Science in the USA: a selected survey," *Journal for General Philosophy of Science*, 5(1): 138–191.
- Krikorian, Y. H. 1962. "Singer's philosophy of experimentalism," *Philosophy of Science*, 29(1): 81-91.
- Lavine, M. 2020. *Race, gender, and the history of early analytic philosophy*. Lanham: Lexington Books.
- Lavine, T. Z. 1981. "The Morris Raphael Cohen Centenary – Introduction," *Transactions of the Charles S. Peirce Society*, 17(2): 94-97.
- Maxwell, G. 1976. "Scientific results and the mind-brain issue: some afterthoughts." In ed. G. G. Globus, G. Maxwell, I. Savodnik, *Consciousness and the brain*, 329-357. Boston, MA.: Springer.
- McCumber, J. 2001. *Time in the ditch: American philosophy and the McCarthy era*. Evanston IL: Northwestern University press.
- McMullin, E. 1966. "Recent work in the philosophy of science," *The Schoolman*, 40(4): 478–518.
- Misak, C. 2013. *The American Pragmatists*. Oxford: Oxford University Press.
- Morris, C. W. 1935. "Some aspects of recent American scientific philosophy," *Erkenntnis*, 5: 142-151.

Nagel, E. 1929. "Can logic be divorced from ontology?" *The Journal of Philosophy*, 26(6): 705-712.

----1954. *Sovereign reason and other studies in the philosophy of science*. Glencoe, Ill.: Free Press.

----1957. *Logic without metaphysics*. Glencoe, Ill.: The Free Press.

----1961. *The structure of science: problems in the logic of scientific explanation*. New York: Harcourt, Brace and World.

Northrop, F. S. C. 1925. "Relativity and the relation of science to philosophy," *The Monist*, 35(1): 1-26.

----1931. *Science and first principles*. Cambridge: Cambridge University Press.

Ramsperger, A. G. 1942. *Philosophies of Science*. New York: F.S. Crofts & Co.

Ratner, J. 1935. "Scientific objects and empirical things," *The Journal of Philosophy*, 32(15): 393-408.

----1937. "Science as history," *The Journal of Philosophy*, 34(15): 393-413.

----1939. "Introduction." In ed. J. Ratner, *Intelligence in the modern world: John Dewey's philosophy*, 3-241. New York: Random House Inc.

Reichenbach, H. 1948. "Rationalism and empiricism: an Inquiry into the Roots of Philosophical Error," *The Philosophical Review*, 57(4): 330-346.

----1952. "Letter to Seeger dated 12 September 1952," *Hans Reichenbach Papers*, Box 38, folder 2, Archives of Scientific Philosophy (ASP), Hillman Library, University of Pittsburgh.

Reisch, G. A. 2005. *How the Cold War transformed philosophy of science: to the icy slopes of logic*. Cambridge: Cambridge University Press.

- Romizi, D. 2012. "The Vienna Circle's "Scientific World-Conception": Philosophy of Science in the Political Arena," *HOPOS: The Journal of the International Society for the History of Philosophy of Science*, 2(2): 205-242.
- Schliesser, E. 2022. "Philosophy of Science as First Philosophy: The Liberal Polemics of Ernest Nagel." In ed. M. Neuber & A. Tuboly, *Ernest Nagel: Philosophy of Science and the Fight for Clarity*. Dordrecht: Springer.
- Salmon, W. C. 1999. "The spirit of logical empiricism: Carl G. Hempel's Role in Twentieth-Century Philosophy of Science," *Philosophy of Science*, 66(3): 333-350.
- Schurman, J. G. 1892. "Prefatory note," *The Philosophical Review*, 1(1): 1-8.
- Smart, H. R. 1931. *The logic of science*. New York: D. Appleton and Company.
- 1934. "Professor Pratt on speculate philosophy," *Journal of Philosophy*, 31(8): 1979-199.
- Soames, S. 2008. "Analytic Philosophy in America". In ed. C. Misak, *The Oxford Handbook of American Philosophy*, 449–81. Oxford: Oxford University Press.
- Stadler, F. 2007. "History of the philosophy of science. From Wissenschaftslogik (logic of science) to philosophy of science." In ed. T. A. Kuipers, *General philosophy of science*, 577–658. Elsevier.
- Swabey, M. C. 1930. *Logic and nature*. New York: The University of New York Press.
- Tilly, J. J. 2005. "Swabey, Marie Taylor Collins." In ed. J. R. Shook, *The dictionary of modern American philosophers*, 2363-2634. Bristol: Thoemmes.
- Ushenko, A. 1937. *The philosophy of relativity*. London: Allen and Unwin.

Vaesen, K. and Katzav, J. 2019. "The National Science Foundation and philosophy of science's withdrawal from social concerns," *Studies in history and philosophy of science*, 78: 73-82.

Verhaegh, S. forthcoming. "Nagel's philosophical development." In M. Neuber and A. T. Tuboly (ed.) *Ernest Nagel. Between Naturalist Pragmatism and Logical Empiricism*.

Werkmeister, W. H. 1940. *A philosophy of science*. New York and London: Harper and Brothers.