

Pragmatic engagements: Philipp Frank and James Bryant Conant on science, education, and democracy

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Abstract This essay examines the relationship between Philipp Frank and James Bryant Conant in light of two issues that engaged leading American intellectuals in the mid-twentieth century: the place of metaphysics in higher education and the responsibilities of intellectuals as educators to defend democracy against the rise of totalitarianism. It suggests that Frank's relationship to pragmatism was nourished by his professional and intellectual relationships to Conant and that each of their contributions to our understanding of science is inseparable from their efforts to engage their fellow intellectuals as well as the public about these pressing issues of their day.

Keywords Philipp Frank · James Bryant Conant · Thomas Kuhn · Pragmatism · Education · Democracy · Philosophy of science

Introduction

Though they both worked and taught at Harvard in the 1940s and early 1950s, Philipp Frank and James Bryant Conant were very different. They were, respectively, a physicist and a chemist by training; a German immigrant and an American; a low-ranking part-time lecturer and a renowned public intellectual and university president. Yet Frank and Conant crossed each other's paths and took great interest in each other's work. Their shared concerns included not only history and philosophy of science, but the place and role of these fields in the academy and the world outside the ivory tower.

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These points of contact between Frank and Conant help to confirm and elucidate Frank's increasing attraction to a pragmatic philosophy of science during his American career.¹ Thomas Uebel has closely reconstructed Frank's moves to pragmatism vis-a-vis the central planks of logical empiricism, namely criteria of cognitive significance (Uebel 2011). I aim not to dispute Uebel's account, but to explore the American contexts in which these shifts occurred and in which Conant is an influence on Frank's career that has been so far overlooked. More broadly, I hope to show that Frank was drawn to pragmatism not only as a doctrine for understanding science, but as the new intellectual soil in which he hoped scientific philosophy would thrive and fulfill its enlightenment promise in the postwar world. Frank's embrace of pragmatism, in some ways, was instrumental, strategic, and itself an embodiment of the pragmatic insight that the world we live in is made as much as it is discovered.

I will conclude by briefly considering Frank's and Conant's relationships to Thomas Kuhn—a figure who helps us understand something of a paradox that now surrounds both Frank and Conant: separately and together, each was enormously important in shaping the landscape of postwar science studies in the United States; yet the kinds of socially engaged projects and problems they took to be the most challenging and important have largely disappeared from that landscape.

Frank's employment in the United States

The first important connection between Frank and Conant concerns Frank's very livelihood after 1939, when Frank obtained a position at Harvard University where Conant was president. That came to be, however, only after Frank failed to get a job at the University of Chicago. The reasons for that failure are worth exploring in detail, for they introduce some of the cultural battles that Frank engaged in for the rest of his career in the United States.

As Adam Tuboly points out in his introduction to this volume, Frank was on a lecture tour of the United States in the late 1930s when Czechoslovakia fell under Hitler's control and Frank and his wife Hania were stranded. Returning to Prague would have been foolhardy because the university had fallen under Nazi control and, among other things, Frank had once lectured in the Soviet Union.² Frank's temporary visa, however, was soon to expire and in order to obtain a permanent visa he had to be employed for at least 1 year as a university professor. Frank's first hope was to obtain a temporary, 1-year position at the University of Chicago, with his old friend and colleague Rudolf Carnap and with Charles Morris, the American philosopher who had befriended the unity of science movement years before and was now helping Frank to organize his lecture tour.

A position at Chicago would have been congenial, for the university was becoming a center of the unity of science movement. Otto Neurath's new

¹ See e.g. Frank (1963), Uebel (2011), Wuest (2015), Nemeth (2003).

² Frank to E.C. Kemble, Feb. 9, 1939 and Feb. 25, 1939. Frank to Harlow Shapley, April 7, 1939, all in Harvard University Archives, Harlow Shapley Papers (HUA-HSP).

encyclopedia was then being published by the university press and its first monographs appeared just a year before. Frank also understood that Chicago's department was friendly to philosophical pragmatism and a science-friendly naturalism. John Dewey and George Herbert Mead developed their philosophies there, while Morris (a student of Mead) was now seeking to reconcile and join logical empiricism and pragmatism (Morris 1937). When Frank arrived in the United States, Dewey taught at Columbia University in New York City, itself another outpost of pragmatism manned by philosophers like Sidney Hook, Horace Kallen, and Ernest Nagel. On one of his earlier trips to the United States, Neurath had enlisted both Dewey and Nagel to write for his new encyclopedia (Reisch 2005: 67, 84–85).

Yet as it was in Europe, philosophies that embraced science had enemies in the United States. The country had always been deeply religious and could look unkindly on intellectuals or subversives who challenged religious and metaphysical orthodoxies (Hofstadter 1963). When the University of Chicago deliberated about whether or not to offer Frank a position, two of the most powerful critics of scientific philosophy were close by: university president Robert Maynard Hutchins and his colleague and sometimes right-hand-man Mortimer Adler. Hutchins and Adler were then debating with Dewey and his follower the merits of science, the nature of philosophy, and the future of education.

As he hoped to join his colleagues at the University of Chicago, that is, Frank had walked into a battle Royale with stakes that were high and rising rapidly as ominous events in Europe made the prospects of another war seem more and more likely. Hutchins had first joined the battle in 1936 when he published his book *The Higher Learning in America* (Hutchins 1936). Placing blame for the nation's problems on the failure of higher education and the nation's intellectual life, he blasted the rigid professionalism and departmentalization of the modern university (Hutchins 1936: 54). It had become, he wrote, an institution which presents students with something of a smorgasbord of disconnected fields of study—"an enormous miscellany, composed principally of current or historical investigations in a terrifying multiplicity of fields" (Hutchins 1936: 92). "The modern university," Hutchins wrote, "may be compared with an encyclopedia," albeit one without any internal, unifying structure:

The encyclopedia contains many truths. It may consist of nothing else. But its unity can be found only in its alphabetical arrangement. The University is in much the same case. It has departments running from art to zoology; but neither the students nor the professors know what is the relation of one departmental truth to another, or what the relation of departmental truths to those in the domain of another department may be. (Hutchins 1936: 95).

Hutchins was not alone in decrying the disunity and disorganization within knowledge. Hutchins's complaints may have encouraged the University of Chicago Press to embrace Otto Neurath's plan when he came to Chicago that same year to pitch his new encyclopedia dedicated to the unity of the sciences. Neurath had in fact criticized the scientific landscape in very similar (albeit overtly Marxist) terms:

The bourgeois formation of thought is indefinite [...] proceeding here in an anthroposophic way, there mathematicising, here psychologizing, there pursuing the idea of fate.... The wealth of scientific detail is no longer held together by a unitary approach and in a certain sense it is left to chance whether a man thinks about some linguistic formations in Chinese or about a medieval legal text, about African beetles or about wind conditions at the North Pole. (Neurath 1928/1973: 294–295).

The new encyclopedia was an effort to unify this chaos and indifference, to “build bridges” among the sciences (as its promotional literature put it) and to cultivate understanding across scientific fields (Reisch 2005: 70, 86).

This similarity ended abruptly, however, in regard to the roles that modern science and logic should take in cultivating the intellectual architectures that Neurath and Hutchins envisioned. For Neurath and his colleagues, the source of any future unity would be science and scientific collaboration. As that unity grew into a comprehensive scientific outlook, there would be less interest in metaphysical ideas that found no place within unified science. Hutchins and his followers, on the other hand, believed this was simply impossible, that there could be no such thing as a coherent scientific worldview. By itself, Hutchins insisted, science collects information randomly, without any criteria of importance or value. “As a contemporary has said,” he wrote, the modern urge to master and control nature through scientific knowledge serves to harm us, not help us:

Behold man the center of the world, a world all the parts of which are inhuman and press against him.... This morality does not liberate man but on the contrary weakens him, dispossesses him, and makes him a slave to the atoms of the universe, and above all to his own misery and egotism. What remains of man? A consumer crowned with science. That is the last gift, the twentieth-century gift of the Cartesian reformation. (Hutchins 1936: 100).

The problem, Hutchins elaborated, is that humanity does not know what facts and information to consume:

Since we do not know precisely which facts will prove to be helpful, we gather them all and hope for the best. This is what is called the scientific spirit.... [It] leads us to accumulate vast masses of data about crime, poverty, unemployment, political corruption, taxation, and the League of Nations in our quest for what is known as social control. A substantial part of what we call the social sciences is large chunks of such data, undigested, unrelated, and meaningless. The study of man and nature and of man and man has thus sunk under waves of empiricism and vocationalism. (Hutchins 1936: 101).

Hutchins did not dismiss science from the ideal university of the future. Two of its three divisions, he explained, would be dedicated to the sciences, natural and social. But the third division that took pride of place belonged to metaphysics. Hutchins reassured his readers that “I am not here arguing for any specific theological or metaphysical system.” But some kind of system, hopefully “the most rational one”

we can cultivate, he insisted, was our only hope “to establish rational order in the modern world as well as in the universities” (Hutchins 1936: 105).

Dewey had created the Laboratory School at the University of Chicago to test and refine his ideas about education. Hutchins similarly treated his university as a laboratory for his reforms. They were often highly controversial. Shortly after he arrived at Chicago in 1929, for example, Hutchins offered his close friend Mortimer Adler a handsomely paid position in the philosophy department. This caused an uproar for a number of reasons, one of which was that Adler was not a trained academic philosopher. At Columbia, he had taught psychology and his Ph.D. was about music appreciation. He eventually found a home in the university’s law school, but not before senior faculty in the department resigned in protest of his appointment and Hutchins’s heavy handed maneuver. This created the openings that brought Morris and, in turn, Carnap to the department (Reisch 2005: 39).

Hutchins and Adler did succeed in the 1930s in reforming Chicago’s undergraduate education. They restructured it around close readings of classic texts in the western intellectual tradition. This style of “Great Books” education lasted until Hutchins’s left the university in 1950; but their advocacy and leadership helped establish and legitimize the Great Books programs which remain today as niche programs in American colleges and universities. With help and funding from the *Encyclopedia Britannica*, they also created the monumental, 54-volume collection *Great Books of the Western World* (Hutchins, ed. 1955) reaching from Homer to Freud. Its periodic updates and especially its *Synopticon: An Index to the Great Ideas* (Adler 1952), a volume that traces 102 concepts that circulate throughout the collection, suggests another point of contact between Hutchins, Adler, and the unity of science project: beyond the encyclopedic metaphor, both sides in this battle were in the business of creating and selling real encyclopedias designed to unify and rationalize modern knowledge.

Because of their fundamental disagreements about the status of metaphysics and religion, however, these camps distrusted each other and accused each other of peddling dangerous misconceptions. Carnap famously dismissed Adler as a medieval atavist in his autobiographical remarks, for example (Carnap 1963: 42). Morris tried repeatedly to convince Hutchins that he had nothing to fear from the unity of science movement and Neurath’s new encyclopedia, but he was rebuffed and dismissed (Reisch 2005: 73–76). From the point of view of Carnap, Morris and Frank, Hutchins seemed both philosophically confused and inclined to stratagems and power plays, such as his controversial appointment of Adler. And one could readily doubt the sincerity of his claim in *The Higher Learning* not to be advocating any particular metaphysical system. The unnamed “contemporary” whom Hutchins quoted to denounce the existential meaninglessness of modern science was the catholic philosopher Jacques Maritain.³ Adler also made no secret of his preference for the metaphysics of Aristotle and Thomas, both of whom are generously represented in the *Great Books of the Western World*.

³ The words Hutchins quoted appear in *Notes et documents*, Issues 22–25, Institut international Jacques Maritain, 1981.

Hutchins's and Adler's sympathy with Thomism and Catholicism greatly agitated the New York pragmatists. Before and during Frank's American lecture tour, these philosophers became more alarmed about the rise of neo-Thomism partly because their own hopes for worldwide socialism were eroding. By the mid-1930s, these philosophers and many other New York intellectuals who once believed that Soviet Russia would be a model for the west began to despair over Stalin's consolidation of power and the brutal, dictatorial regime he was building. Hook, Dewey, and Kallen condemned Stalin and threw their support behind the exiled Bolshevik Leon Trotsky. They created the American Committee to Defend Leon Trotsky and in 1937 sponsored trials in Mexico (over which Dewey presided) to defend Trotsky against Stalin's attacks [see, e.g., Phelps (1997)].

Combined with the growth and organization of Catholicism in American culture and education, it seemed to the New York pragmatists that the nation was veering away from science and naturalism toward religion and supernaturalism. In 1937, the same year that Dewey, Hook, and Kallen tried to support and promote Trotsky, they organized the first Conference on Methods in Philosophy and the Sciences. Held at New York University, it was designed to shine light on "a strong and growing trend toward dogmatic authoritarianism in philosophy and the sciences." Dewey, the featured speaker, praised natural science and experimental inquiry as a method to combat social problems, while Hook attacked Adler and Hutchins as reactionaries calling for a modern "retreat from reason."⁴

When Dewey's first contribution to Neurath's new encyclopedia appeared in 1938, Hutchins was not named; but there was no doubt that Hutchins and Adler were among the targets he denounced as beholden to "ideas that descend from the prescientific epoch" and which become "crystallized in institutions" and against which Dewey called all supporters of modernity and progress to rally. The unity of science movement as Dewey described embraced an attitude that "forms the sole alternative to prejudice, dogma, authority, and coercive force exercised in behalf of some special interest" (Dewey 1938: 35).

Frank was aware of these mutual hostilities, but he remained hopeful that he might get the job at Chicago. Importantly, his appointment would not cost Hutchins's university much because Frank had obtained funding for 1 year from the International Institute of Education in New York. But Frank did not get the job. He reported in early 1939 that Hutchins and his administration objected to the appointment. The substance of the objection remains unclear in Frank's correspondence about it; but he reported that he and "my friends in the department suspect that these objections are rather a pretext":

For a certain time everybody observes at the University of Chicago a tendency of the President to influence the faculties and particularly the Department of Philosophy in favour of Neo-Thomistic philosophy. President Hutchins, who is himself in all philosophical questions under the influence of Dr. Mortimer Adler, a champion of Catholic philosophy at the University of Chicago,

⁴ See "Notes," *The International Journal of Ethics* 48, No. 1 (Oct, 1937): 141–42; (Gilbert 1997: 85).

dislikes the activity of the Carnap-Group (of Logical Empiricism) and does not want any inforcement [sic] of this Group.

Hutchins and Adler, Frank added, see this group as competition—“a stumbling-block”—to their goal of making scholastic philosophy the blueprint for modern education at Chicago and beyond.⁵

Frank was once again in peril, for his visa would expire May 1. In the wake of this disappointment, Carnap then wrote to Percy Bridgman asking whether Harvard or any other university that Bridgman could think of might invite Frank for a year. Bridgman responded hopefully that Harvard might invite Frank. But within weeks Frank’s hopes were dashed again, for the Harvard Corporation had met to consider the matter and chose not to invite Frank.⁶

Upon hearing this news, the Harvard astronomer Harlow Shapley sprang into action. He was sorry for Frank and evidently annoyed—with Harvard, higher education, and “civilization” itself—for the situation that had developed. “It is humiliating that one of your high ability and great attainments should be in such serious difficulties,” he wrote to Frank. “It makes one ashamed of the civilization.” For years, Shapley had worked tirelessly with refugee organizations to find new homes for displaced scholars. And it seems that upon learning of Frank’s situation he resolved not to be defeated. He took the matter up with Conant personally and wrote 2 days later to tell Frank the good news: Conant agreed to personally ask the Corporation to reconsider its decision. Financial support would have to come from outside the university, but Shapley had connections and he used them. He brokered promises from both the Institute for International Education and the Rockefeller Foundation to support Frank’s first year. “I feel a great relief to know, that by your friendly efforts the situation at Harvard seems to me much better now,” Frank wrote to Shapley. Indeed it was better, for by May, 1939 the appointment was approved by the Corporation. Shapley’s work on behalf of Frank was not over, however. He helped secure funds for Frank’s second year at Harvard, from 1940 to 1941, at which time Harvard agreed to make Frank a permanent part-time member of the faculty.⁷

Unlike Hutchins, Conant admired logical empiricism. He enthusiastically welcomed the unity of science movement to Harvard at the Fifth annual Congress for the Unity of Science, for example. A dozen years later, preparing to teach a course in philosophy of science for the first time, Conant explained that his philosophy of science was something like a “mixture of William James’s *Pragmatism* and the logical empiricism of the Vienna circle, with at least two jiggers of pure skepticism thrown in.”⁸ Conant’s remark captures Frank’s philosophical ambitions at Harvard—to temper the formalism of Vienna Circle

⁵ Frank to E.C. Kemble, March 17, 1939; see also Frank to Kemble, Feb. 25, 1939, HUA-HSP. The surviving copies of these letters do not include the year 1939 in their dates; but their context and proximity to other letters in Shapley’s papers indicate this year and I have dated them accordingly.

⁶ Frank to P. W. Bridgman, March 24, 1939; Carnap to Bridgman, March 16, 1939, HUA-HSP.

⁷ Shapley to Frank, April 3, 1939; April 10, 1939. Frank to Shapley, April 13, 1939, HUA-HSP. On Shapley’s active career, see his autobiography (Shapley 1969).

⁸ Conant to John Boyer, Sept. 12, 1952, James B. Conant Personal Papers, Harvard University Archives.

philosophy with pragmatism, itself embracing historical and sociological study of science, so as to make scientific philosophy better able to understand the living practices of science and better able to thrive in the United States.

The conferences on science, philosophy, religion

This convergence between Frank's and Conant's interests in education would become strongest after the war. When Frank first arrived at Harvard, however, in 1939, the feud that swirled around his failed appointment at Chicago continued and the stakes seemed only higher as war broke out in Europe. Issues surrounding higher education, unifying the sciences and combatting special interests in modern life were still important; but Hitler's successful military adventures made it seem that democracy itself was threatened and that western civilization itself was broken.

In response, some intellectuals set out to organize and build institutions to help save democracy. Others panicked. And some did both. One of the first examples of panic was Horace Kallen's attack on Neurath and his unity of science project at the International Congress for the Unity of Science at Harvard. Kallen was so agitated by the creeping totalitarianism he perceived around the world and in the United States that he charged that Neurath was complicit with totalitarian thinking. Trying to unify the sciences, he insisted, was akin to regimenting and controlling research itself (Kallen 1940). Neurath and Kallen debated this charge after the war and it proved to be one of Neurath's last debates. His final reply to Kallen was published posthumously.⁹

One of the most effective organizers, on the other hand, was Rabbi Louis Finkelstein of the Jewish Theological Seminary in New York City. Alarmed by the rise of Hitler and fascism, and convinced that this had something to do with the godlessness of the modern world, Finkelstein had organized in 1937 a yearly series of conferences ambitiously titled the Conference on Science, Philosophy, Religion and their Relation to the Democratic Way of Life (CSPR). By including "Religion" in his title, Finkelstein was apparently nodding to the conference organized by Kallen, Hook, and Dewey which acknowledged only "science" and "philosophy" as bulwarks against totalitarianism. Finkelstein's respect for science, in any case, was not superficial. The man he chose to represent science on his planning committee was Harlow Shapley, to whom Frank owed his position at Harvard and whose discoveries in astronomy and advocacy of science education had made him one of the nation's most famous and celebrated scientists.

Through Shapley, Frank quickly became involved in Finkelstein's conference. In the summer of 1940 Frank met personally with Finkelstein in New York to deliver the essay on "Science and Democracy" that he would read at the first conference.¹⁰ Frank met him again a year later and was plainly enthused about participating in the CSPR. By the end of the 1940s, if not earlier, Frank joined the Board of Directors.¹¹

⁹ See Kallen (1946a, b, c, d), and Neurath (1946a, b).

¹⁰ Gilbert (1997: 340) n. 53; Frank to Shapley, June 22, 1940, HUA-HSP.

¹¹ See, e.g., Bryson et al. (1950, 1964).

Years later he collected and edited the lectures and talks he gave each year at the CSPR to create his book *Relativity—A Richer Truth* (Frank 1950).

It was at the first CSPR in 1940 that Mortimer Adler took his dispute with logical empiricism to a new level. In his lecture “God and the Professors” he hyperbolically denounced “positivist” intellectuals who put their faith not in metaphysics but in science. Drawing heavily from Hutchins’s *The Higher Learning* and defending Hutchins’s claim that only a hierarchical metaphysical system could save higher education and civilization, Adler remarked that the threat posed by positivists was akin to ancient tyranny—a threat to civilization more menacing than Hitler. It would not be overcome “until the professors and their culture are liquidated” (Adler 1941: 134).

Even before Adler began speaking, his paper and participation caused a commotion. Finkelstein had commissioned it personally, and persuaded Adler to participate in the conference despite his misgivings about the logical empiricists and Deweyites who were involved. Dewey himself refused to participate when Finkelstein invited him, and Kallen demanded from Finkelstein some explanation for why Adler had been invited. Upon reading Adler’s paper beforehand, Shapley became upset and indicated that any remarks he would offer in response would be so coarse they would have to remain off the record (Gilbert 1997: 77). When Adler read his paper on the second day of the conference, the scene nearly descended into chaos and violence. Hook reported that when he tried to engage Adler critically Finkelstein stamped on Hook’s foot “under cover of the low wood partition that separated us from the audience” (Gilbert 1997: 78; see also Hook 1987: 337).

In the wake of Adler’s attack, Hook, Dewey, and Ernest Nagel took the dispute to the pages of *Partisan Review*. Under the title *The New Failure of Nerve* they chided Adler and other Thomists for only pretending to help preserve democracy (See, e.g., Hook 1943). In fact, they charged, Thomists were taking refuge in apriorism and supernaturalism (see Reisch 2005: 78 for a summary of this forum). Dewey and Kallen then organized another conference, the Conference on the Scientific Spirit and Democratic Faith—a title that purposefully excluded “religion” as it exalted “spirit” and “faith”—which was held in 1943 (Hook 1987: 347; Gilbert 1997: 84)

Frank’s contributions to the CSPR

Finkelstein and other organizers had originally called for unity—a unified defense within or around certain concepts that could unite science, religion, and philosophy to defend higher learning and democracy. As one put it at the first meeting, civilization would surely collapse unless “we can evolve some basic idea to which people of intelligence in the different spheres of life would pledge” (Gilbert 1997: 71). Finkelstein explained in his introduction to the conference proceedings that philosophers, theologians, and scientists were now as important as diplomats and standing armies, because the military struggle in Europe was “but one phase, perhaps a minor phase, of a far greater conflict.” At root, the current crisis was a battle of ideas and ideology—a battle “between ideas which make for the

development, and those which make for the destruction of human civilization” (Finkelstein 1941: 11).

Frank proposed just such a basic idea—one to which scholars and citizens around the world could reasonably pledge, and one that had long been constructive of cultural and intellectual development. This was the methodological idea of relativity that Frank extracted from Einstein’s physics, combined with Bridgman’s operational pragmatism, and generalized for philosophy and learning. Frank explained,

We may, for example, assume that we can deduce our preference for specific institutions – such as government by the people – from the general principle that we have to obey God’s will. In order to carry out the deduction we have to make use of an “operational definition” of God’s will, and find out whether a specific action is in agreement with God’s will. (Frank 1950: 41–42)

The same followed when ethical choices were derived from so-called “absolute principles” such as God’s will or Kant’s categorical imperative. “Without using the operational meaning we derive from our abstract principles only abstract principles. We never get in touch with an actual human problem.” So it is—and always has been, Frank emphasized—that human beings have made use of operational definitions and “qualifications that play logically the same role as the ‘relativizing’ additions in the Theory of Relativity and in recent physics generally” (Frank 1950: 42). Far from destroying or challenging human values and beliefs, as some more reactionary participants of the CSPR believed, the methodological core of relativity theory had been “instrumental in the progress of human knowledge” (Frank 1950: 41–43, 5).¹²

Relativity as Frank presented it is not only “a richer truth,” as the title of Frank’s book announced; and it is not, as Stephen Toulmin glibly put it, “logical empiricism as told to the children” (Toulmin 1951: 181). Frank presented the relativity idea as an example of the *unifying truth* of methodology of the sort that Finkelstein and his conferees aimed to locate. At the same time, Frank aimed to show Hutchins and Adler precisely why they were mistaken to understand science as a fact-generating process that is bereft of intellectual and cultural values. They were correct that human knowledge and education could admit global principles to connect and unify different kinds of knowledge; but they were wrong to maintain that any such principles had to be introduced from the outside, from religion or metaphysics. One unifying principle could be found in state-of-the-art physics.

James Conant responds to neo-thomism and the unity of science movement

Conant never participated in the CSPR. But as a Germanophile he was just as alarmed about the rise of Nazism in Germany as Adler, Frank, Finkelstein, and others in the CSPR. As an educator, he shared their belief that whether or not the

¹² For perspective on Frank’s (1950) I am indebted to Nemeth (2003) which nicely summarizes Frank’s engagement with democratic theory.

United States would resist or succumb to totalitarianism would be largely determined by the nature and quality of public education. During the war, Conant was consumed by his then-secretive work in the Manhattan Project. But even before the bomb was successfully designed and tested, when the defeat of Hitler seemed likely, he made plans to introduce reforms in American education that he believed would be crucial for maintaining peace and freedom in the postwar world. In 1943, he formed a committee of Harvard faculty to examine the state of education and formulate proposals for methods and curricula in General Education in American high schools, at Harvard, and at the many colleges that were sure to be inspired by Harvard's example. Conant's committee issued its final report, *General Education in a Free Society* (Harvard University 1945) to much fanfare in 1945. Perhaps only coincidentally, the committee's plan echoed the tripartite architecture of Hutchins's ideal university: each Harvard undergraduate would be required to take at least one newly formed course in three areas—the social sciences, the natural sciences, and humanities (not, alas, metaphysics). The requirements were intended for students to at least glimpse what Conant called the general and unifying patterns—democracy, the progressive, forward motion of liberal thinking, and pragmatic toleration of regional and ethnic differences—that separated western freedom from Soviet totalitarianism.

The committee agreed that education must encourage intellectual and cultural unity among students of very different aptitudes, talents, and inclinations. It must “foster that fellow feeling between human being and human being which is the deepest root of democracy” (Harvard University 1945: 9). As for the unifying principles of such a system, the committee acknowledged the “enormous variety of aim and method” currently on offer in schools and colleges and the range of solutions that had been proposed to reduce this chaos. Conant and his committee addressed the proposals offered by the main factions within the CSPR—Finkelstein and his fellow theologians, Hutchins and Adler, and the scientific philosophy that Frank promoted. They considered sectarian solutions and “the conviction that Christianity gives meaning and ultimate unity to all the parts of the curriculum, indeed the whole life of the college.” They considered the Great-Books ideal of unity “in the great writings of the European and American past.” And they considered “the pragmatist solution” which “sees in science and the scientific outlook this saving unity” that education and culture require (Harvard University 1945: 39).

This last proposal's casual pairing of pragmatism with the “scientific outlook” of logical empiricism points to Conant's imprimatur and his personal philosophical sensibilities. Yet for all his admiration of logical empiricism, Conant and his committee did not side with scientific philosophy or the agitated New York philosophers seeking to purge religion from the educational and cultural landscape. The problem with these pragmatists, the report explained, was that they were “not pragmatic enough”:

There is always a tendency in this type of thought to omit as irrelevant the whole realm of belief and commitment by which, to all appearances, much of human activity seems in fact swayed. And if pragmatism be extended to

include this realm of value, then it runs the danger of losing its scientific character. The question is at bottom whether the scientific attitude is in truth applicable to the full horizon of life, and on this question there is, to say the least, uncertainty.

Though he pointed broadly to “human activity,” Conant and his committee were concerned primarily about the United States. And they knew that neither students at Harvard nor the rest of the nation were prepared to abandon metaphysics and religion and replace them with a scientific outlook, as the logical empiricists and the New York pragmatists had long proposed.

“Thus the search continues,” the committee wrote as it introduced its own solution to the problem of disunity in the curriculum and the culture—a vision of higher education that steered a more accommodating course between tradition and change, between religion and science, between principled conviction and pragmatic tolerance of deeply opposing views and beliefs (Harvard University 1945: 40–41).

Metaphysics, pragmatism, and general education

Frank responded substantively to Conant’s general education project and to Conant’s book, *On Understanding Science* (Conant 1947) in which he laid out his proposals for how to teach science to laymen and nonscientists through case studies of pivotal historical episodes in science’s history. Shortly after the book appeared, Frank discussed it with his funding officer at the Rockefeller Foundation and said that his next book (evidently *Modern Science and Its Philosophy*, published in 1950) would complement Conant’s approach by putting less emphasis on “factual history” and more emphasis on philosophy of science.¹³

In the introduction to that book Frank’s remarks point to the ongoing evolution of his attitude toward and understanding of metaphysics. Before 1947, he wrote, “I had stressed the point that science gives no support to metaphysical interpretations, of whatever type.” Yet in the United States, he wrote, “I became more and more interested in the question of the actual meaning of the metaphysical interpretations of science – idealistic, materialistic, relativistic, and others” (Frank 1949: 51). By “actual meaning,” I suggest, Frank pointed to the practical meanings and purposes that these metaphysical views served in this new landscape. On this reading, Frank’s remarks seem to embrace and echo Conant’s education report: if any viable plan for general education must respect the ways in which American citizens are “swayed” by unscientific beliefs and commitments, then scientific philosophy and the unity of science movement to be viable in American intellectual culture must also accept and engage these metaphysical proclivities. They are not just confusions or distortions in modern thought; this is the new soil in which scientific philosophy was to be replanted and this had to be accepted as a basic, fundamental fact. As Frank put it in

¹³ “WW diary May 20, 1947,” Rockefeller Archive Center, Tarrytown, NY, Rockefeller Foundation papers 1.100, box 35, folder 281. WW is Warren Weaver, to whom Frank also reported “Mr. Conant’s continuing interest in their work” in the unity of science in November, 1949 (“WW diary Wednesday 23, 1949,” folder 282).

regard to these metaphysical lenses through which intellectuals interpreted modern science, this devotion to metaphysics “is as firmly established, by our experience, as any fact of physics” (Frank 1949: 52).

This helps to illustrate how Frank’s career diverged from those of his fellow logical empiricists who had also come to the United States. Carnap, for example, not only dismissed Adler; he firmly rejected an invitation from Finkelstein to participate in the CSPR by telling Finkelstein sincerely (if impolitely) that “intellectual progress will only be achieved in the long run if the scientific attitude prevails more and more against the metaphysical and theological ways of thinking.”¹⁴ Carnap could not support Finkelstein’s project, but Frank could and did—both by attending the conferences regularly, squaring off against nonscientific intellectuals of many stripes, and publishing *Relativity—A Richer Truth*.

As for Conant’s project in General Education, Frank was well positioned to join his crusade. Even before Conant had formed his exploratory committee, Frank had addressed science education and national politics in 1940 at his first presentation to the CSPR. Frank recalled that as Nazism began to grow in Europe he and others in Prague observed that advanced students in mathematics and science were less susceptible to Nazi propaganda than engineering students (Frank 1941: 218–19). This was because more advanced students at least tacitly understood that words and propositions require active interpretation and practical use to determine their intended meanings. They were therefore less moved and motivated by ambiguous banners and slogans and other kinds of propaganda. Frank illustrated his point by explaining in detail how the Nazi racial classifications that emerged under Hitler were so confused as to violate simple logical rules (Frank 1941: 220–22).

Were all students exposed to the philosophical and semantic issues raised by philosophy of science, including the relativity-idea that Frank returned to frequently in his CSPR lectures, then science education could plainly become an ally of democracy and an obstacle to propaganda and totalitarianism. Conant’s General Education project aimed for precisely this goal, as Conant noted when he addressed Frank’s Institute for the Unity of Science in 1950: one task of general education was to teach science effectively to “the lawyer, the statesman, the businessman, the newswriter” (Conant 1951: 9) so that leaders in society would better understand how intellectual freedom, creativity, and a plurality of methodological styles and convictions helped drive both scientific and cultural progress.

After 1947, Frank adopted similar terminology in his teaching and promoted the case-study techniques that Conant had popularized in *On Understanding Science*. Conant had written, for example, that historical case studies would help students begin to understand that “science is indeed a social process” and that “the instructor could relate each case history to a developing pattern” in social or economic life that helps to “illustrate the relation of science to society.”¹⁵ Frank also spoke of social and cultural *patterns* as contexts for science [“I now put the greatest emphasis on presenting physics, and science in general, as part of our general pattern of

¹⁴ Rudolf Carnap to Louis Finkelstein, March 24, 1942. Jewish Theological Seminary of America Archives, General Files, Box 4.

¹⁵ Conant (1947: 31), 106. See also page 64. Conant made similar points earlier in Conant (1944: 406).

thinking and acting” (Frank 1949: 50, 51)] and in the *Journal of American Physics* heartily endorsed a case-study approach for teaching the Copernican revolution: “By its failure to give an adequate presentation of this historical dispute our traditional physics teaching misses an opportunity to foster in the student an understanding of the relations between science, religion and government which is so helpful for his adjustment in our modern social life” (Frank 1949: 232). To Conant’s point that case studies can bring science to life, almost magically “transporting an uninformed layman to the scene of a revolutionary advance in science” as Conant put it (Conant 1957a: ix), Frank wrote that a historical case study of sulfuric acid (H_2SO_4) could “let the student live through the exciting historical and psychological experience that eventually found its abridged expression in such a formula” (Frank 1949: 233).

Even in his more general writings in philosophy of science, Frank adopted Conant’s signature term “conceptual scheme” to define science and its essential forward motion. “Science emerges,” Conant wrote in *On Understanding Science*,

from the other progressive activities of man to the extent that new concepts arise from experiments and observations, and the new concepts in turn led to further experiments and observations. [...] This dynamic quality of science viewed not as a practical undertaking but as development of conceptual schemes seems to me to be close to the heart of the best definition. (Conant 1947: 24).

Many other Harvard scholars adopted “conceptual schemes” during these years and Frank was among them. The phrase appears frequently in his writings beginning in the late 1940s.¹⁶

Conclusion: Frank, Conant, and the two cultures problem

In their alliance to reform how science is taught to nonscientists and its place in American culture at large, Frank’s and Conant’s alliance in the 1940s and 1950s can be seen in terms of what would become known as the two-cultures problem. This problem was memorably formulated by the British chemist and novelist C.P. Snow. “I believe,” Snow said in 1959, that “the intellectual life of the whole of western society is being increasingly split into two polar groups.”

Literary intellectuals at one pole – at the other scientists, and as the most representative, the physical scientists. Between the two a gulf of mutual incomprehension – sometimes (particularly among the young) hostility and dislike, but most of all a lack of understanding. They have a curious distorted image of each other. (Snow 1961: 4)

10 years before Snow’s diagnosis of the academy’s ills became well known, Frank dedicated his Institute for the Unity of Science to addressing this mutual

¹⁶ See, e.g., Frank’s essay “Logic and Metaphysics in Modern Science,” (in Frank (1949: 286–303), Frank (1957a: 30, b). On Conant’s earlier adoption of “conceptual schemes” from his Harvard colleague L.J. Henderson, see Isaac (2012). For an example of a Harvard political historian adopting the phrase from Henderson, see Brinton (1965: 9).

incomprehension and to “work for an integration between the sciences and the humanities” (Frank 1951: 6). He also offered his last published book as an explicit contribution to this controversy. It was titled *Philosophy of Science: The Missing Link Between Science and Philosophy*, but in the introduction Frank made it clear that his concern was not just philosophy but the humanities—a point he made while quoting from Hutchins’s *The Higher Learning in America* (Frank 1957a: xii–xiii).

In 1957, Conant discussed the mutual incomprehension between humanists and scientists in very similar terms to those Snow would soon employ. Where Snow had anthropologically described the incomprehension and antipathy between different tribes of intellectuals at Cambridge, Conant drew on his decades of experience at Harvard: “Experience has shown,” he wrote,

how difficult it is to place the study of science on anything like the same footing as the study of literature or art or music. A scientist or engineer may be able to participate in a stimulating manner in a discussion of pictures or books or plays, but it is very hard indeed to keep a conversation going about physical science in which the majority of the participants are not themselves scientists or engineers. (And while I should be the first to deny that facility in conversation was a goal of education, nevertheless listening in on a social gathering may be a permissible diagnostic method). (Conant 1957b: xv)

Conant wrote this in his foreword to *The Copernican Revolution*, the first book by Thomas Kuhn. The book grew out of Harvard’s General Education program in which Kuhn first taught history of science. Conant had left the presidency of Harvard and his general education program 4 years before, but he heartily endorsed Kuhn’s book as a continuing effort to unify and heal the world of learning—to cultivate methods of teaching “so that the nonscientist will acquire a better understanding of science” and “to provide some broad base for the cultural life of the nation” (Conant 1957b: xiv).

Like Frank, Kuhn learned a great deal from Conant. By reading and teaching *On Understanding Science*, Kuhn began to transform himself from a physicist into a historian of science. He too adopted the terminology of conceptual schemes as he taught in the General Education program and in *The Copernican Revolution*.¹⁷ Kuhn also knew Frank, who in the early 1950s invited him to join a committee in his Institute dedicated to research in the sociology of science. Along with Morris and Carnap, Frank and his Institute sponsored *The International Encyclopedia of Unified Science* which commissioned what would become Kuhn’s second book, *The Structure of Scientific Revolutions* (Kuhn 1962).

The enormous success and influence of *Structure* is a testament to how influential both Frank and Conant were in shaping the postwar future of science studies. But there are some ironies involved that help explain why and how their shared interests in science education and interdisciplinary understanding across the sciences and the humanities now seem unfamiliar, if not antique and unprofessional. It was Frank, for example, who coined the phrase that “history of science is the workshop of the philosophy of science” (Frank 1949: 278) but it is Kuhn’s *Structure* that is usually

¹⁷ For a useful comparison of Kuhn’s *Structure* with Conant’s writings, see Wray (2016).

celebrated for making philosophy of science take history seriously. It was Conant, for example, who popularized the “conceptual schemes” out of which Kuhn developed his not-altogether-different theory of scientific paradigms. But paradigms quickly eclipsed and replaced conceptual schemes in the literature of science studies after the early 1960s.¹⁸

The point is not simply that Kuhn became more famous or influential than Frank and Conant; but that Kuhn’s book helped to shift science studies away from these engagements with democracy, the public, and matters of mass politics and culture. In the wake of *Structure* there emerged a vast literature of commentary, analysis, and criticism, much of it concerning fundamental claims, such as whether paradigms exist, what they are, and whether they perform the many social and epistemic functions Kuhn ascribed to them. Kuhn himself would reject his concept of paradigms within several years after *Structure* appeared, but the concept was rapidly and widely embraced across the academy—not, as Frank or Conant might have wished, as a unifying idea or concept, but rather one that encourages specialization and independence from other intellectual communities and matters of culture and politics. That, after all, is how science works, as Kuhn explained to Frank in a letter from 1952 about the sociology of science: “It would seem to me,” Kuhn wrote, that for any sociologist of science, it would

be more fruitful to example the ubiquitous role of the sociology of the professional group than to concentrate solely on those factors (like government, church, etc.) which at this time and place have relatively little impact upon decisions made by professional scientists about problems arising within their own sciences.¹⁹

Kuhn had not yet coined his terminology of paradigms and paradigm shifts at this time. But he evidently sensed that the future of science studies lay in a different direction than the one Frank and Conant once imagined.

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¹⁸ The Google N-gram, which indexes and counts the appearance of words and phrases in published book (<https://books.google.com/ngrams>) shows vividly how “paradigms” overtook “conceptual schemes” and “Thomas Kuhn” overtook “James Bryant Conant” by 1970.

¹⁹ Kuhn to Frank, n.d. (probably December 1952). Thomas S. Kuhn Papers, M.I.T. Libraries, Box 25, folder 53.

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