

The Global Comrades of Mr. Democracy and Mr. Science:
Placing May Fourth in a Transnational History of Science Activism

Sigrid Schmalzer

**PREPRINT VERSION – Please consult and cite the published version here:
<https://doi.org/10.1080/18752160.2020.1868698> (EASTS 2021)**

ABSTRACT:

The May Fourth movement is widely recognized as a watershed within Chinese cultural and political history, but it was also a significant local episode within a global history of *science activism*. Quaintly idiosyncratic as Chen Duxiu’s “two gentlemen,” Mr. Democracy and Mr. Science, may appear, they have also animated (in only somewhat less personified form) a transnational “conversation” very much alive today. Focusing on neglected Marxist participants, this paper reconstructs meaningful snatches of that long conversation in China, Russia, Britain, the US, and Japan. It finds that Chinese voices contributed in timely and important ways, especially on the problem of imperialism for science and democracy. It further shows that Marxists, in China and beyond, have shared certain modernist values with their liberal counterparts, including a faith in the democratic potential of universally valid scientific knowledge; however, they have offered highly divergent perspectives on what constitutes democracy and how it relates to science, challenging liberal efforts to separate science from politics and highlighting the contradictions generated by capitalism. A fuller understanding of the significance of Marxist and Chinese contributions to the cumulative discourse on science and democracy, and a livelier engagement with their voices, will help generate more liberatory socio-technical imaginaries.

In January 1919, prominent Chinese intellectual and political activist Chen Duxiu famously summoned “Mr. Democracy” and “Mr. Science” to “cure China of all the darkness in its politics, morals, academics, and thought.” As quaint and idiosyncratic as these “two gentlemen” may appear, they were in fact part of a global community. In only somewhat less personified form, this powerful pair has animated a sustained, transnational discourse of what I call *science activism*—which combines, variously, analysis of science in society, efforts to promote science in the public sphere, and political interventions to affect science policy and/or transform scientific institutions.

Adopting a transnational and chronological approach, this article places Chen Duxiu's "two gentlemen" in conversation with some of their counterparts through time and around the world. I am interested specifically in discourse on science, rather than in scientific practice, and I explore whatever the historical actors (who include public intellectuals, political activists, scientists, historians, philosophers, sociologists, and STS scholars) identify as "science," rather than defining science from an external vantage point. What I call a conversation sometimes involved actual exchanges of ideas through the movement of people and texts, but I do not confine the exploration to documented interactions. While Zuoyue Wang's contribution to the volume offers a highly contextualized study of the way two Chinese scientists embodied the values of Mr. Science, I trace a wider web of discourse across the globe, focusing specifically on instances in which historical actors explicitly paired the terms *science* and *democracy*. At the same time, like Wang I extend the discussion forward in history to show that the central themes of the May Fourth movement went beyond the time-bound "Wilsonian moment," constituting a sustained engagement with the crises and opportunities presented by the longer cultural and political struggles over modernity. I conclude with a reflection on the meaning of science and democracy for activists today; like the historical actors who populate the narrative—from Qu Qiubai to Sandra Harding, from Robert Merton to Fang Lizhi—I do not separate the analytical from the ethical, the academic from the political.

The evidence supports a number of related arguments, which I will lay out systematically before launching the transnational historical narrative. First, it reveals that China was by no means a latecomer to the conversation on science and democracy, nor were Chinese voices less relevant because their nation lacked power on the international stage. We will find, for example,

that Chinese writers contributed especially pointed criticism on the role of imperialism in subverting science and democracy, a theme neglected by their Western counterparts. If those outside China failed to engage the discourse inside, this merely underscores the power asymmetries that structured the “negotiations, pushes and pulls, struggles, and stops and starts” that characterize much of what STS scholars call “circulation” (Fan 2012, 252)—and that apply equally to the circulation of ideas about science as they do to scientific knowledge itself.

Second, I argue that discourse on science and democracy is not inherently “liberal”; Marxists were in it from early on and remain important critics today. Historian Tse-Tsung Chow and others were no doubt right to restore liberalism—with its commitment to modernizing China through cultural reform rather than through political transformation—to the history of the May Fourth Movement, correcting the CCP’s historical narrative that turned May Fourth into a mere precursor of communist revolution (Chow 1960). However, the new dominant narrative has gone too far in defining May Fourth, especially its key slogan science and democracy, as the liberal alternative to communist revolution. While what it has meant to be liberal or Marxist has changed over time, these political identities have remained significant to historical actors down to the present and around the world, and Marxists have continued to offer important challenges to liberal formulations of science and democracy.

Third, by tracing the web of global discourse I reveal the common ground that liberal and Marxist writers on science and democracy have occupied in China and beyond, and also expose critical lines of cleavage. Marxists and liberals have sometimes come together from political necessity, but they have also shared modernist values, including a faith in the democratic potential of universally valid scientific knowledge and in some cases a belief that a democratic

spirit of dissent is essential to scientific inquiry; problematically, Marxists have also often shared with liberals elitist assumptions about the duty of scientific elites to educate the “ignorant” or “superstitious” masses. Nonetheless, liberals and Marxists have offered highly divergent perspectives on what constitutes democracy and its relationship to science; Marxists have rejected liberal expectations as to the purity of science and its autonomy from political processes, and they have consistently drawn attention to the contradictions posed by capitalism, imperialism, and other power structures in the pursuit of science and democracy.

In analyzing both the shared terrain and the fault lines, I draw inspiration from Elena Aronova (2011) and Alexei Kojevnikov, who depart from “a dualistic kind of analysis with a set of polar categories” that “hides away analogous trends and dependencies, to make invisible mutual influences and borrowing” (Kojevnikov 2008, 134). Placing the actors in conversation demonstrates that in some historical moments, science and democracy have served as “boundary objects” in the sense that Star and Griesemer theorized (1989)—malleable enough to allow for many divergent interpretations, but coherent enough to hold together even when tossed about in vigorous debate. In other contexts, they have served more as *boundary-making* objects, as historical actors themselves created polarized characterizations and so distinguished their own ideological perspectives.

There is no doubt that this conversation on science and democracy will continue as the world grapples with the escalating twin crises of social injustice and ecological devastation. Marxist contributions to the discourse have had global influence in the past, including in liberal-capitalist countries. The more we persist in directly engaging radical voices from around the

world and through history, the more critical will be our analysis and the greater our capacity for liberatory transformation.

Russia, 1904-1917

Numerous scholars have plumbed history back to ancient times to identify connections between science and democracy (Sigerist 1938; Needham 1946; MacLeod 1997). However, the explicit coupling of the terms *science* and *democracy* is harder to trace. The earliest such reference I have found is from Russian plant scientist and science popularizer K. A. Timiryazev, whose book *Science and Democracy* was not published until 1920 but who had already begun trumpeting “Science and Democracy” as a motto in 1904 (Kojevnikov 2002, 254; Platonov 2001, 59). Timiryazev and other progressive Russian scientists had been influenced by the writings of British positivists—for example the 1861 *History of Civilization in England* (translated and published in Russian in 1863), in which British positivist Henry Thomas Buckle declared, “the hall of science is the temple of democracy” (Hachten 2002, 186).

In 1917, the Russian science journal *Nature* published an essay by the prominent literary figure Maxim Gorky. Titled “Science and Democracy,” the piece was based on a lecture Gorky had delivered at the Free Association for the Development and Dissemination of the Positive Sciences (Gorky 1978a). Gorky quoted Timiryazev as saying, “The future belongs to science and democracy” and went on to assert, “I deeply believe that if it is not enriched by science, democracy has no future.” The monarchy and elite classes had suppressed the people’s drive to seek knowledge, but the dissemination of science, that “most positive force in the world,” would break the fetters of prejudice that bound the Russian people.

Through a fanciful description of an ideal scientific community, Gorky further illustrated the role he saw for democracy in supporting science. He envisioned “science cities” where “scholars dwell in an atmosphere of freedom and independence” and “every scholar is a priest, independently devoted to their own god.” He additionally privileged the educated classes by calling for “people with rational knowledge to serve as representatives” and declaring this “form of democracy” consistent with “an understanding of the significance of the positive sciences” (Gorky 1978b, 474).

Such arguably elitist statements did not prevent Gorky from being attacked as a populist in 1918 by anti-Bolshevist Dmitri Filosofov—specifically for his alleged promotion of science dissemination above scientific research. In response, Gorky declared it obvious that “the free development of science must precede its free dissemination.” However, he strongly defended the importance of science dissemination and stated that the “essence” of Filosofov’s perspective was “anger against democracy” (Gorky 1995, 180-81).

Gorky’s 1917-1918 writings combined two distinct but compatible understandings of the relationship between science and democracy. The first sought to use science to enlighten the broad masses and so modernize the nation. The second preserved a privileged space for science and role for scientists: democracy safeguarded the “purity of science” by guaranteeing autonomy for intellectuals; and intellectuals with scientific understanding were to make the political decisions.

China, 1915-1923

The influence of Russian revolutionary ideology on China is widely recognized; either Timiryazev or Gorky could have served as inspiration for Chen Duxiu. However, there were also precedents closer at hand. A generation of Chinese reformers, also influenced by British positivists, had already introduced the concepts of science and democracy, if not the explicit coupling of the terms (Schwartz 1964, 65, 197-200). In 1895, Yan Fu had called for “dispelling the false and esteeming the true in academics, and subordinating the private in favor of the public in political administration,” a pairing that intellectual historian Li Zehou has interpreted as a precursor to May Fourth science and democracy (Li 1979, 279). More recently, Chen had surely read *Science* (Kexue), the magazine of the Science Society of China (Wang 2002, 299-301). An editorial in the magazine’s inaugural issue (January, 2015) proclaimed, “In the powerful countries of the world, the development of people’s rights and national strength have necessarily run parallel to the progress of its academic thought.” If we take “people’s rights” (民权) as roughly synonymous with “democracy,” and “academic thought” (学术思想) as “science,” the connections to Chen Duxiu’s “two gentlemen” become clear (Fan and Li 1989, 43-44).

Eight months later, Chen published his famous essay, “Call to Youth.” He wrote, “Modern European people have gained their superiority through the flourishing of science (科学) no less than through democratic theory (人权说).” The two functioned together “just as a cart has two wheels,” thus China should “emphasize science and democracy equally” (Chen 1915). Then, in January 1919, Chen wrote more forcefully of the need to “support Mr. Democracy and Mr. Science” by actively opposing old philosophy, morals, politics, art, and literature, along with

the “national essence” (Chen 1919). Between them, the two essays captured a potent meme and greatly facilitated its replication among intellectuals of the May Fourth era and down to this day.

On 1 May 1919, US pragmatist philosopher John Dewey, assisted by his disciple Hu Shi, began a two-year tour of China lecturing on science and democracy. In late 1920, Bertrand Russell and Dora Black arrived for their own seven-month visit. Although Dewey was a liberal, and Russell and Black were socialists, the three shared a view of democracy as dependent on a rational public educated in the scientific method (Ogden 1982, 574n132, 594; Wang 2007, 16). Their conversations with their Chinese hosts and the larger public had enormous, lasting impacts on Chinese discourse.

John Dewey’s influence in China is sometimes portrayed as a moment of opportunity for liberalism lost under the rising tide of radicalism. Chen Duxiu’s embrace of communism was by such accounts a turn away from Dewey, and thus also from his earlier faith in his two gentlemen (Schwartz 1968, 23; Wang 2007, 49). In fact, for Chen Duxiu the line between Dewey and Marx was perhaps not so sharp. Dewey promoted a fourfold vision of democracy, encompassing political, civil, social, and economic elements (Kuo 1975, 76; Wang 2007, 16-17). The civil component resonated strongly for Chinese liberals—as we have already seen in the use of “people’s rights” (民权、人权) to signify democracy by both the Science Society of China and Chen Duxiu in 1915. Meanwhile, Dewey’s emphasis on grassroots economic cooperation as a means of practicing and building democracy spoke to those, like Chen, inclined toward socialism (Kuo 1975, 74-76). While Mao and other CCP leaders would come to denigrate pragmatism, they explicitly sought to radicalize and claim for themselves the concepts of science and

democracy—and implicitly maintained a “Deweyan imprint” in their political theory and practice (Heilmann 2008, 18).

In 1923, Chinese intellectuals began a heated debate on “science and the philosophy of life” (科学与人生观), also known as the debate on “science and metaphysics” (科学与玄学). Some argued that science properly undergirded all aspects of society; others insisted that science was limited and contended that China should root its modernity in Eastern civilization. Poorly preserved in historical memory are the contributions of CCP member and Marxist literary scholar Qu Qiubai. Qu argued that any discussion of democracy or science must be embedded in an understanding of political and economic structures—in particular clan society, capitalism, and imperialism. He alleged, “Strong countries first leisurely advance ‘democracy’ and then turn around and become imperialists resolutely opposing democracy, first advance scientific civilization and then turn around and become anti-science profiteers.” Criticizing science in the abstract for the devastations of war missed the point. “Global capitalists” used science, including military technology, to benefit a small number of people, leading to war and misery for the majority. But the fault lay with capitalism, not with science. If it served the majority, science would lead to tremendous advancement. “To reach this great goal will require a world revolution. This is the conclusion of ‘proletarian social science’” (Qu 1923, 73-75).

Qu Qiubai’s contribution to this Chinese debate was also a strand in a larger, transnational Marxist conversation. Nikolai Bukharin’s 1921 *Historical Materialism* had provided the concept of “proletarian social science”—in contrast with “bourgeois social science,” which presented itself as “pure” but suffered from the “blindness” of its class position. By 1930 the book would be widely available and influential in Japan (Perry 2014, 49), but Qu had earlier and more direct

access during his 1921-1922 sojourn in Moscow. Qu further advanced the notion that “scientific civilization was born of the capitalist class, and it is also the starting point for the destruction of the capitalist class.” This perspective was a potent theme of 1930s communist party writings on science around the world (Werskey 1988, 189), and it challenged the ideology of their liberal counterparts. Thus, thanks to Qu Qiubai and others, themes that had not grown stale internationally by the 1930s were already in play in China by 1923.

The Popular and United Fronts Transnationally, 1938-1945

In the 1930s and 1940s, consistent with the broader political alliance known as the Popular Front, Marxists and liberals shared a view of science and democracy as linked forces threatened by fascism while serving, moreover, as essential weapons in the anti-fascist struggle (Kojevnikov 2008, 128). They further agreed on an impressively broad set of understandings, including that science was embedded in social and political-economic contexts; that democracy played a positive (or even necessary) role in science; and that democracy in science implied the rejection of social privilege. At the same time, contradictions between democracy and capitalism had become apparent, and Marxists were proposing ways they might be resolved under socialism.

Groundwork had been laid in Europe by the Vienna Circle, whose politically diverse members agreed that society needed a “Scientific World Conception” (the title of their 1929 manifesto) opposed to metaphysics—which we may recognize as part of the same larger conversation to which the 1923 Chinese debate on science and metaphysics had contributed. Then, in 1931, Bukharin brought a delegation of Soviet scholars to London to participate in the Second International Congress for the History of Science. This was a signal event for an

emerging group of public-minded communist scientists—including J. D. Bernal and Joseph Needham—known as the Social Relations of Science movement. Moreover, the Soviets' externalist perspective on the history of science made a dramatic impact not only on leftists, but also on the likes of US sociologist Robert Merton (Schaffer 1984).

In 1938, Henry Sigerist—a Swiss historian of medicine at Johns Hopkins—penned an article, “Science and Democracy,” that forwarded a strong Marxist perspective. Proffering that the “same basic forces led to the rise of democracy and of science,” he traced the developments from ancient times through the rise of capitalism, which “required science” and for which “democracy appeared as the ideal form of government so long as it could be controlled by the bourgeoisie.” Sigerist engaged head-on the dominant liberal discourse. “Only democracy, we hear, can guarantee freedom of scientific research and can protect science against interference by outside powers.” However, under capitalism, a scientist had to “sell his labor power,” and religious authorities restricted freedom of inquiry and teaching. Fortunately, “our capitalist democracy...is not the only possible form of democracy. In the Soviet Union a tremendous effort is being made to build a new type of democracy based on an economic system under which the means of production, distribution and transport are owned by society...for the benefit of all” (Sigerist 1938, 294-97).

The following year, British Marxist scientist J. D. Bernal released *The Social Function of Science*. Bernal expected that science would “prove decisive” in the struggle against fascism with, and only with, the cooperation of politically enlightened scientists and progressive social movements. He noted the participation of scientists in the creation of the Popular Front and in establishing a workers' university in France. He concluded, “What we need is the extension of

such collaboration between the forces of Science and Democracy throughout the world. By coming together the two will grow to understand one another. Science will find its full liberty and development, and the democratic forces will come to learn its powers and possibilities” (Bernal 1967 [1938], 404-405). Thus, in Bernal’s eyes, democracy was a force of liberation for science, while science was a force of strength for democracy.

In the US, Robert Merton’s 1942 “A Note on Science and Democracy” delineated the elements of what he called the “scientific ethos”: universalism, communism, disinterestedness, and organized skepticism. For this early sociologist of science, universalism meant above all that anyone (regardless of “race, nationality, religion, class and personal qualities”) should be able to participate in science. He explicitly allowed that “the political apparatus designed to put democratic values into practice” might vary, but maintained that “to the extent that a society is democratic, it provides scope for the exercise of universalistic criteria in science” (Merton 1942, 118, 121). Merton recognized that capitalism might impede scientists in the necessary sharing of knowledge, and that some (and he specifically cited Bernal) had thus advocated for socialism. However, even as he adopted the language and some of the analytical interventions of his Marxist contemporaries, he succeeded in producing “a liberal argument for the autonomy of science” (Turner 2007, 175) whose influence on liberal conceptions of science and democracy cannot be overstated.

The tension between a democratic science and a capitalist economic system was not lost on Chinese sociologist Fei Xiaotong when he visited the US in 1943. Recalling Chen Duxiu’s metaphor, Fei wrote of “the two wheels of the vehicle to happiness,” namely “science and democracy.” In the US, however, the conflation of democratic individualism with economic

libertarianism had led to “imperialistic economic dictatorship.” Thus, “science and democracy occupied contradictory and antagonistic positions,” resulting in a “temporary misalignment between the two wheels of the vehicle to happiness” (Fei Xiaotong 2007, 43-53; Cholakova 2009, 116-17).

Meanwhile, back in China, the Communists and Nationalists were tenuously holding on to their own collaboration agreement as they fought Japan. Writing in 1942, CCP founding member Zhang Shenfu (a philosopher and devotee of Bertrand Russell and Albert Einstein) declared science and democracy “preconditions for carrying out the United Front and the War of Resistance.” He further articulated an understanding of the spirit of science similar to Merton’s. Science was inherently democratic because it was objective, progressive, universally beneficial, intolerant of elitism, deeply social, and egalitarian. At the same time, democracy was inherently scientific because it was intolerant of superstition or ignorance and because it was idealistic (Zhang 1942, 435-38; Schwarcz 1992, 181-82). Here, democracy was a force for inclusion, while science served as a rationalizing and visionary force.

In these same years, Mao Zedong began claiming the legacy of the May Fourth movement for the CCP and solidifying a radical interpretation for science and democracy. In his 1940 “On New Democracy,” Mao pronounced “new-democratic culture” to be anti-imperialist, anti-feudal, and scientific; it stood for “seeking truth from facts, for objective truth and for the unity of theory and practice” (Mao 1967, 381). Two years later, Mao declared the May Fourth opposition to “old dogma” in support of “science and democracy” to be “quite right,” and he recognized May Fourth contributions to anti-imperialist struggle. However, Mao argued that the movement had split into two currents: the communists “inherited its scientific and democratic

spirit and transformed it on the basis of Marxism,” while the rightists, lacking the “critical spirit of historical materialism,” “took the road of the bourgeoisie” (Mao 1965 [1942]).

In late 1944, left-wing Nationalist intellectuals launched the Democracy and Science Forum (民主科学座谈会) to bring the May Fourth spirit to bear on the war of resistance and national reconstruction efforts. (The group would later change its name to the Jiusan Society —“September 3rd Society”—after the date of victory over Japan.) In the lead editorial for the inaugural issue of the organization’s journal, *Democracy and Science* (民主与科学), founding member and Russian studies specialist Zhang Ximan expanded on a common May Fourth theme. Europe had replaced feudalism with capitalism and so had enjoyed the development of science; however, China had replaced feudalism with bureaucratism and so had remained fettered. China would join the age of democracy and science only once it transformed its “backward” thinking; the Soviet Union offered evidence that revolutionary democracy, scientific cadres, and an enlightened populace would lead to greatness (Zhang 2015 [1945], 61).

One theme found in Chinese writings on science and democracy is noticeably rare in the Western materials: imperialism. However, in a 1934 article, American leftist journalist Joseph Barnes documented the Soviet transformation of the “science” of sinology. The Soviets had identified “bourgeois sinology” as “an ideological weapon in the colonial policy of imperialism”: its mythology of an exotic, tradition-bound land provided a cloak for imperialist plunder. Barnes wrote, “To Marxist scholars, such a science can have no meaning. To foster it, they charge, would be like supporting alchemy or astrological studies. Instead, the new generation must develop a new science. Working on the basis of Marxism and Leninism, they have been told, they must elaborate a new discipline in harmony with the ‘general line’” (Barnes 1934, 332).

Being “told” to conform to a “general line” will no doubt suggest to many of us a disturbing lack of intellectual autonomy. Still, the critique of old-fashioned sinology addressed a deficiency in the liberal view of democracy and science. The Soviet effort to remake sinology by recognizing China as a dynamic part of the modern world represented one piece of a Marxist endeavor to transform science along anti-imperialist lines—an earlier version of what leftist scholars and political activists now call “decolonizing science” (Boisselle 2016).

The US and Japan, 1945-1965

With the onset of the Cold War, many scholars in the capitalist bloc began reinterpreting the concept of “democracy” to stand against communism rather than fascism (Kojevnikov 2008, 128; Olwell 1996, 20). Emblematic of this perspective was philosopher of science Karl Popper’s 1950 *The Open Society and Its Enemies*, an impassioned plea to refute Marxist perspectives on democracy (414ff) and to defend the democratic institutions that made scientific objectivity possible (490). Similarly, president of Harvard University James Conant advanced the notion that science was inherently progressive but required a liberal democracy to flourish (Reisch 2014).

However, this pat understanding had begun unraveling before it ever truly coalesced (Aronova 2014), and the Soviet launch of the Sputnik satellite in 1957 presented a new snag. If Lysenkoism had bolstered confidence in the inherent superiority of science in liberal-capitalist countries, Sputnik suggested that autocratic communist states could produce good science—or even outstrip their liberal counterparts. In Sputnik’s wake, Conant’s star pupil Thomas Kuhn began formulating his challenge to the notion of science as a progressive, inherently democratic enterprise, arguing instead that conformity and authority constituted the norm (Reisch 2014).

And so Cold War US writings on science and democracy did not always bolster triumphalism, but instead “underscored an uneasy sense that to behold the Soviet Union was to gaze through a mirror darkly” (Wang 1999, 289).

For all the complexities of this literature, it did (and does) often conceptualize “democracy” in remarkably narrow terms. Take, for example, political scientist Don Price’s pronouncement: “Science is not democratic, nor is it undemocratic. The notion of democracy, or ultimate rule by votes of the people, is simply irrelevant to science. For science is mainly concerned with the discovery of truths...; its issues cannot be decided by votes” (1965, 172). Such statements construed democracy in terms of representative politics and policy making under liberal-capitalism, or even in the very specific sense of majoritarian elections. Within this framework, the most progressive form science activism might take would be one in which scientists provided politically neutral “information” to the electorate, thus safeguarding democratic process (Moore 2008, 127).

Meanwhile, on the other side of the globe, the US labored to shape postwar Japan into a liberal-capitalist ally against an expanding communist bloc. However, beginning in 1946, the Association of Democratic Scientists (Minshushugi kagukusha kyōkai, or Minka for short) provided a space for liberal and Marxist scientists to develop their own articulations on the relationship between science and democracy. Historian of science Shigeru Nakayama doubts that Minka scientists were “especially conscious of the Chinese [May Fourth] precedent,” but he notes that in both cases, movement participants identified the past political order as hostile to both science and democracy. For May Fourth activists, it was the Confucian tradition; for members of Minka, it was imperial Japan’s militarist state (Nakayama 1991, 19).

For both May Fourth and Minka, what began as a liberal or politically open cultural challenge became especially attractive to Marxists. The Japanese Communist Party took a leading role in condemning the “feudalism” of Japanese science and articulating a “new democratic way of science for the reconstruction of Japan” (Nakayama 1991, 20). As the US Occupation became increasingly hostile to communism, Minka became a haven for JCP members and other leftists: the scientific identity of the organization provided something of an illusion of political neutrality.¹

Within Minka, the Society for Corporate Research in Geology (Chidanken) presented an especially robust democratic vision for science. Its leader, the geologist Ijiri Shōji, did not identify as a Marxist but drew much inspiration from Marxist epistemology and political philosophy. Ijiri sought to dissolve the barrier between professional and amateur geologists. He saw scientific methodology as rooted in practice, which for Ijiri was “related to an ethic of social action.” The venturing of hypotheses, moreover, depended on a “denying or dissenting spirit” that emerged from “class-consciousness itself.” Ijiri’s vision for democracy in science thus applied class analysis to the specific practices of working scientists. Chidanken was democratic not in the sense that intellectuals would be protected from politics or that the ignorant masses would become enlightened as modern citizens, but rather that people from all classes would participate with critical consciousness in the intellectual and physical practices of producing knowledge (Nakayama 1974, 270-89).

The Soviet Union and China, 1957-1968

1 A very similar pattern was later found in the Kerala Science Literature Movement [KSSP] in India. After Prime Minister Indira Gandhi cracked down on leftist organizations in 1975, Marxists began entering KSSP in larger numbers. As with Minka, the fact that KSSP was a science organization lent it an apparently apolitical character, which made it a safe place for Marxists to keep organizing (Zachariah and Sooryamoorthy 1994, 67).

The Soviet Union and Mao-era China presented very different contexts for Marxist discourse on science and democracy from those of the US and Japan. With communist parties firmly in control, scientific organizations provided no haven for dissident leftists, but rather sites of negotiation between state officials and scientists. Moreover, the political pressure to engage in boundary-making—to distinguish liberal and Marxist perspectives on science and democracy—was still greater in the Soviet Union and China than among leftists in capitalist contexts.

In the Soviet Union, official publications continued to reference Timiryazev's pairing of science and democracy into the 1960s and beyond, sometimes delving deeply into the relationship between these two social forces. For example, a 1958 article recognized utopian socialists, Russian revolutionary democrats, and "the advanced scientists of all countries" for envisioning "the union of science with the people, with democracy"; it credited Marxism-Leninism for making such a union possible and the the Soviet communist party for turning it into "an historical fact." The author took pains to note that under "socialist democratism," science ceased being "for the amusement of a precise mind" and became "a means for transforming the world"; it directed science toward the preservation of peace rather than the pursuit of war; and it provided opportunities for "every person who is skilled in scientific work to... make a contribution to the treasure-house of science." Socialist democratism provided "a true freedom of scientific investigation." This meant the liberation of science from the oppressive forces of feudalism, capitalism, police interference, and "capricious" administrators; unlike the anti-Soviet "slander" of US critics, the author found no place for "'freedom'... from the leadership of the socialist state" that directed science toward fulfilling social needs (Fed'kin 1958).

State officials in China could have evoked Mr. Democracy and Mr. Science when promoting their science dissemination programs or the “mass science” projects that mobilized laypeople to participate in scientific research on a far greater scale than Ijiri Shōji could in postwar Japan. That they did not take this opportunity suggests a reluctance to bring too much attention to that powerful pairing. Nonetheless, Mao-era state organs periodically celebrated the May Fourth movement, while explicitly challenging the liberal-capitalist version of science and democracy. For example, an article published in 1959 called upon people to “carry on the tradition of Mr. Democracy and Mr. Science promoted by the May Fourth movement,” specifically by “combining revolutionary energy and scientific analysis; letting ambitions soar while seeking truth from facts; and thinking big and acting small” (Xijiu bao 1959). Here democracy was a revolutionary force while science was a rationalizing one.

Other articles offered a more cautious endorsement. During the anti-rightist campaign, historian Huang Yuanqi (1957) bluntly attacked the “rightist-capitalist Hu Shi group” for importing the “reactionary philosophy” of pragmatism from the US. While Huang recognized that Hu Shi and others had contributed to the united front by attacking the old feudal culture, he nonetheless declared their advocacy of science and democracy a “pretense”—recalling Qu Qiubai’s 1923 critique. In a 1962 article, journalism professor Li Longmu characterized Chen Duxiu as limited by his elementary understanding of Marxism. “At that time, the weapons used under the banners of science and democracy to oppose feudalist thought ranged from democratic thought flourishing under eighteenth-century capitalism to imperialist thought under twentieth-century monopoly capitalism.” Thus, Li advocated using “Mr. Democracy” only in terms of “the

‘New Democracy’ under the guidance of Marxist thought” so as not to “remain at the level of Chen Duxiu’s understanding” (Li 1962).

The post-1949 Chinese state’s reluctance to fly the May Fourth flags of “science and democracy” without qualification, not to mention its iron-handed treatment of scientists who challenged party authority, speaks to its hostility toward scientific autonomy and other values that liberals consider fundamental to democratic science. On the other hand, Marxists have rightly noted the failures of liberal discourse to account for the complex workings of political, economic, and social power in science, and for the implications of science for power relations. A 1961 article by historian Cai Shangsi connected his own Marxist analysis back to the 1923 critique advanced by Qu Qiubai.

Before the May Fourth movement, and especially before the October Revolution, the radical democrats... did not understand that if China was to be fundamentally transformed it was necessary to overturn the reactionary systems of imperialism and feudalism... Therefore, though they promoted Western ‘democracy’ and ‘science’ and revealed the reactionary nature of the feudalist political-ethical thought, they could not take the next step to expose the disharmony of the socio-economic system and social life... and they were still less able to point the spear of attack against imperialism.

Cai closed his essay with a meditation on the contributions of Qu Qiubai, who had directly tackled the relationship between science and political economy. Cai thus sought to carry forward the legacy of Qu’s Marxist analysis, which had transformed science and democracy from forces of enlightenment against ignorance to forces of revolution against oppressive social structures.

US, Britain, China, Vietnam, and USSR, 1968-1975

The social movements of the 1960s and the political crises brought by the Vietnam War inspired renewed energy among leftists concerned with the social and political relations of science. In 1968, leftist scientists formed the British Society for Social Responsibility in Science (BSSRS). The following year, a group of US physicists formed what became known as Science for the People (SftP). Both organizations drew from earlier Marxist writings on science and society, while updating the analysis to account for the dramatic post-war transformations of science and to engage on questions of gender, race, and imperialism (Schmalzer et al 2018; on Japan in the same period, see Nakayama 1991).

Democracy was not a watchword for this new generation of activists. Where they referenced it, they followed the Marxist critique of “bourgeois democracy” in which “votes are the nominal source of political power, [but] ownership of the means of production is the real power” (McEwan 1975, 10), and they favored the “popular” or “participatory” democracy found in China, Nicaragua, Mozambique, and other socialist contexts. In 1970, SftP members disrupted the annual meeting of the American Association for the Advancement of Science. Taking the podium before the National Academy of Sciences president was to speak, they said:

In 15 minutes Philip Handler is going to talk to you for an hour and a half about how procedures and practices in the Pentagon can be made more rational, and how the scientific community can help prop up the ruling class' corporate profit by distributing scarcity more effectively. We're here in the interest of the people upon whom the power of the ruling class is exercised, the people who are not interested in rationalizing their rule, but destroying it. The people of this country and the world did not select Handler to be

head of the National Academy of Science or [Glenn] Seaborg to be president-elect of the AAAA\$, in fact, neither did the great majority of you, but you can be damned sure that the decisions of these men will affect all of us. (B. F. 1971, 7)

Their intervention offered a Marxist critique of the failures of bourgeois democracy to provide access to the real power structures governing science.

Members of BSSRS, SftP, and like organizations were far more attuned to the question of imperialism than their predecessors; indeed, they were deeply inspired by the writings of Mao and other Third-World thinkers, and some even traveled to China, Vietnam, Nicaragua, and other revolutionary societies to study their examples. In 1972, SftP published an article by mathematician Chandler Davis about his visit to China and Vietnam the previous year. He began by listing some of the many slogans he encountered:

Let science serve the people!

Work to serve revolution, not to serve yourself!

Culture must belong to the masses, not to an elite!

Full equality for women!

Full equality for national minorities!

End the worship of foreign models!

Make the past serve the present!

Davis emphasized that most if not all of these slogans were “quite familiar in the West,” since they were “supported by the Soviet-bloc Communists” and were “current in our own left.”

Davis further noted the absence of slogans about academic freedom or student power: “the principles of the academy’s immunity from outside interference and of local [academic]

participatory democracy,” which pervaded American university politics, had no place there. This underscores the dramatic contrast between the meaning “democracy” held for liberals seeking to protect science from political influence, and the meaning it held for Davis and other Marxists who sought to prevent scientists from isolating themselves from broad democratic participation and legitimate state direction.

The work of organizations like SftP struck a chord with Soviet observers in the 1970s. A 1975 article highlighted calls for “democratic control over scientific research” emerging from “democratic movements in the West which communists participate in and support.” The author applauded them for recognizing that a “close union of science and democracy” required opposition to “the foundations of the system of private ownership,” which had resulted in “alienating science and scientists from the main mass of workers” (Frolov 1975). Thus did Marxists continue to engage in a global conversation on science and democracy, though this time liberals rather than fascists represented the chief opposition.

China, 1976-1989

The April Fifth incident of 1976, in which intellectuals publicly mourned the death of Zhou Enlai, moved the political lines of the conversation on science and democracy in China. As Australian historian Wang Gungwu observed at the time, “Even while the theorists of the Communist Party are explaining how inadequately the May Fourth writers understood the revolutionary needs of the Chinese people, they are acknowledging that the two key demands of May Fourth are what China most needs today: science and democracy. Indeed, it is really in comparison with the nature and the course of the May Fourth Movement that the [Cultural

Revolution] is now seen as a ‘false’ cultural revolution and the April Fifth as having genuine potential” (Wang 1979, 680-81). Such official signals opened more space for liberal dissidents. Just as the May Fourth activists had evoked democracy in contrast with feudalism, and Minka activists had evoked democracy in contrast with militarism, post-Mao dissidents evoked democracy in contrast with the ancien regime of Mao-era radicalism.

State officials and liberal scientists agreed that science was a modernizing force, but disagreed on the role of democracy (Miller 1996). In 1981, party leader Hu Qiaomu declared that democracy cannot produce truth: only scientific research can do that (Hu 1981, 152). Two years later, he further explained that democracy requires the minority to follow the majority, while science cannot function in that manner. We have seen this observation before in the 1960s writings of US political scientist Don Price. However, in Hu’s hands it became an argument supporting party authority over those “excessively emphasizing democracy”: new China had arisen not through majoritarian elections, but through the leadership of a minority group, the CCP, which had grasped science—and particularly the science of Marxism (Hu 1983, 269-71). Notably, back in 1957 physicist-historian Xu Liangying and historian Fan Dainian had offered an interpretation that would continue to satisfy liberals decades later: recognizing that truth cannot be decided by a vote, they explained that in the domain of science democracy should manifest as freedom to discuss and debate (Xu and Fan 1957, 142).

The liberal perspective on science and democracy in early post-Mao China is well represented in the choice in early 1978 to translate and reprint Gorky’s 1917 speech “Science and Democracy” (Gorky 1978a and 1978b). Gorky’s vision of scientists supported and protected in sovereign communities resonated strongly for Chinese scientists emerging from the Mao era—

when politics were firmly “in command.” As Rudolph Wagner (1985) has shown, early post-Mao science fiction found deep inspiration in the Saint-Simonian fantasies of Jules Verne, who similarly envisioned communities where scientists enjoyed material comfort, intellectual autonomy, and political influence.

The pairing of science and democracy found even more fertile ground in the political organizing that culminated in the 1989 occupation of Tiananmen Square. In 1981, physicist and historian of science Xu Liangying published his “Essay on the Role of Science and Democracy in Society” in the influential *Journal of Dialectics of Nature*. Xu followed the standard Marxist narrative in locating the rise of modern science and democracy within the emergence of capitalism, while predicting that science and democracy would ultimately lead to the replacement of capitalism with the superior system of socialism. However, he distinguished “genuine” democracy from the Mao-era “democratic work-style” and “mass line”: the latter turned people into “followers,” whereas genuine democracy turned them into “masters.” Xu’s argument directly challenged Mao’s understanding of democracy. Like other Marxists, Mao had condemned bourgeois democracy as a tool for keeping real power in the hands of the few; the mass line was supposed to circumvent the elites and place the interests of “the masses” first. However, Xu portrayed bourgeois democracy as an important political stage and argued that attacks on it dealt a devastating blow to democracy more generally (Xu 1981).

In a talk presented on 25 February 1989, astrophysicist and democracy activist Fang Lizhi moved away from the Marxist focus on imperialism in science to celebrate its cosmopolitanism. Fang slammed official commemorations of the May Fourth anniversary for adopting the theme of patriotism in place of science and democracy. He then delivered a sustained critique of

“nationalistic patriotism” from the perspective of cosmopolitan science and democracy. He wrote, “In science, we approach a situation by asking if a statement is correct or incorrect... We do not ask if a thing originates with our race or nationality... I think that many scientists have a perspective that transcends their own particular culture.” He further suggested that beyond the natural sciences, “society itself” possessed “universal precepts” or “truths” that transcend national or other divisions. These included concepts of human rights and the broad concept of democracy, regardless of the different forms a particular country’s democratic system might take (Fang 1991, 244, 246). While for Hu Qiaomu, the capacity of science, and science alone, to produce truth presented a limit to democracy, for Fang Lizhi it presented a limit to nationalism.

Fang’s assertion of a universal principle of democracy, and his use of science to underscore that universalism, brings into focus an essential difference between liberal and Marxist or radical understandings of science and democracy. In the liberal configuration, science is powerful precisely because it is universal, and its universality may even extend to grant universalism-once-removed to its partner, democracy. On the other hand, the radical configuration emphasizes the profound rifts separating concepts of democracy produced in different historical periods under different political-economic conditions—for example, eighteenth-century capitalism, twentieth-century imperialism, and Mao-era socialism. For radical critics, science is powerful not just because it is objective but because it is political, not just because it is universal but because it is transformative. And democracy is liberating when (and only when) it “points the spear of attack” against capitalism, imperialism, and other forces of oppression.

Britain and the US, 1985-2007

In 1985, the British Royal Society published a landmark report, *The Public Understanding of Science*. Its explicit concern was the need for citizens to have scientific knowledge to fulfill their political obligations in a democratic nation. A slew of publications in both Britain and the United States echoed this theme. (Interestingly, the authors' anxieties about science illiteracy highly resembled those expressed by early twentieth-century modernizers in China, Russia, and many other places, where this perceived lack was assumed to arise from their "backward" cultural level as compared with the West.) However, the Royal Society appeared equally concerned to overcome the public's "hostility," which impeded "successful exploitation" of new technologies beneficial to the national economy. Notably absent in the report was any recognition of political or economic power, except with respect to the public's "fears about the power of large organizations." The report's repeated urging of industry leaders to increase their involvement in public science education strongly implied that the problem lay with the (presumably irrational) public fear of corporate power, rather than with the power asymmetries themselves.

STS scholars soon began offering critiques of this public understanding of science (PUS) movement. Though they do not typically offer a structural analysis of power relations, the STS writings generally display an anti-elitist politics by questioning the "deficit model," which assumes public opposition to certain technologies is rooted in "ignorance" (Irwin and Wynne 2011). Some scholars have sought to salvage PUS by recasting it as "public engagement with science" (PES); Sheila Jasanoff has in turn proposed "civic epistemology" as a means to "bring the missing public back into studies of science and democracy" (Jasanoff 2011, 248). Elsewhere, Jasanoff has called for STS scholarship to "interrogate the place of science and technology in

alternative imaginaries of democratization” (Jasanoff 2017, 276). Jasanoff has tended to assume a liberal-capitalist democratic context; re-engaging Marxist interlocutors would considerably expand our ability both to critique science within bourgeois democracy and to imagine alternative democracies that are more sensitive to the many forms power takes.

And in fact, though marginalized, these voices have never disappeared. For example, Sandra Harding’s 1993 book, *The “Racial” Economy of Science: Toward a Democratic Future*, foregrounded anti-racist, anti-imperialist struggles and assembled the voices of a wide range of Marxist scholars and scientists. In their contribution, SftP members Richard Levins and Richard Lewontin brought the historical analysis of their Marxist forebears up to date: “In some ways, the fate of science parallels that of bourgeois democracy: both were born of exuberant forces for liberation against feudalism, but their very successes have turned them into caricatures of their youth. The bold antiauthoritarian stance of science has given way to a monopoly vested in those who control the resources for research and publication... The idealized egalitarianism of a community of scholars has shown itself to be a rigid hierarchy of scientific authorities integrated into the general class structure of the society and modeled on the corporation” (Harding 1993, 315).

China, 1989-2018

In the wake of the June Fourth crackdown on democracy activists, the Jiusan Society—recuperated as an official “democratic group” representing science and technology professors within the CCP—launched a journal, still published today, once again titled *Democracy and Science* (Minzhu yu kexue). As with the Jiusan Society itself (Seymour 1986), the journal

represents both a venue for scientists to voice political perspectives and a means for the state to keep those voices closely in check. In its pages, and in many other journals, science and democracy appear as integral components of Chinese socialism, without pointing any inconvenient spears of attack. For example, a 2003 article reflecting on Chen Duxiu's slogan, "Emphasize Science and Democracy Equally," characterized May Fourth science and democracy as fundamentally about ridding China of superstition and promoting the value and dignity of the individual. Moving to the present, the author concluded, "Without democracy, there can be no socialism, just as without the development and application of science and technology there can be no modernization of socialism" (Ji 2003).

The voluminous publications on science and democracy during this period also include writings of liberal dissidents charting the boundaries of the permissible. In 2010, physicist and editor of *Journal of the Dialectics of Nature* Li Xingmin published an essay, "Science and Democracy, Freedom and Internationalism." Li is an expert on Einstein who participated alongside Xu Liangying and Fang Lizhi in the late-1970s debates over physics and Marxist ideology. In this article, he engaged with a wide range of Western scholarship, demonstrating once again the larger transnational conversation in which Chinese writers on science and democracy have participated. Li engaged but ultimately rejected the critical, dialectical-materialist perspective offered by Marxist biologists Levins and Lewontin (quoted above). Li favored instead a liberal, Mertonian view of the scientific ethos, and he cited Glenn Seaborg (a target of Science for the People's ire) on the inherently democratic spirit of science. He closed the essay by celebrating the universalist, cosmopolitan culture of scientists in a manner highly reminiscent of Fang Lizhi's 1989 lecture—without referencing that forbidden name.

2019

The long conversation on science and democracy, in which May Fourth leaders played an early and significant role, has brought us to 2019. Today the stakes of science and democracy are arguably higher than ever before. The presidency of Donald Trump in the United States has shocked the globe with a frontal assault on the authority of scientific knowledge. The response has been dominated by a liberal analysis that takes for granted the capitalist order and the top-down structure of scientific knowledge. For example, the Center for Science and Democracy (a project of the Union of Concerned Scientists) has adopted a slogan, “Engaged scientists + an informed public = a stronger democracy,” striking for its asymmetry: scientists engage politically, while the public merely receives information. What if scientists were better informed about the experiences and perspectives of people at the grassroots? What if people at the grassroots engaged with science? Of course, numerous voices are calling for just that, including within the recently revived Science for the People movement (<http://scienceforthepeople.org>). And to be fair, the Center for Science and Democracy has clearly built on the cumulative work of Marxist and other radical thinkers over the past century in its commitment to “breaking down barriers between scientific knowledge and the public, helping to make science a tool for racial equity and justice, and helping scientists and communities collaborate to solve problems” (<https://www.ucsusa.org/our-work/center-science-and-democracy>).

Meanwhile, in China the Xi Jinping administration has continued to embrace science and technology as a party priority, while further introducing the principle of “ecological civilization” and the global (some would say imperialist) development program, “One Belt, One Road.” This

official platform may be tantalizing for science activists in a place like the US, where many top political leaders reject both the science that explains ecological crises and the notion that the government must intervene. Indeed, Chinese scientists are finding ways to use the governing ideology to do meaningful work for environmental sustainability and social welfare. However, we should be very cautious about endorsing the PRC's current brand of eco-authoritarianism, which has forged powerful tools for legitimizing state power over both society and nature, in China and abroad.

Democracy matters deeply in science activism, and not just for liberals. How does it matter?

Science activists in the May Fourth movement and far beyond have presented science and democracy as inherently linked. This perspective is hard to sustain unless we adhere very strictly to an Enlightenment perspective. If we define science as a thing that emerged in Europe simultaneously with this other thing that we are defining as democracy, then yes: science and democracy are historically linked. However, if we break these hegemonic definitions to view science and democracy as taking many different forms in different times and places, that historical connection becomes far less generalizable.

Admittedly, many dissident intellectuals in China continue to find it productive to retain the Enlightenment perspective. As Li Xingmin said in 1990, "Without dissent there is no science, and without dissenters there are basically no scientists" (Miller 1996, 223). This is the notion that science is intrinsically critical of authority, which Kuhn undermined with his 1962 *The Structure of Scientific Revolutions* and which has nonetheless been held dear by many liberals and Marxists alike. We may rightly applaud scientists who through their practice and community

discover a dissenting spirit and identify as dissidents, but it is inaccurate and dangerous to imagine that science necessarily nurtures dissidence: scientists have built too much of the apparatus of state and corporate power.

We have also seen science celebrated as democratic in the sense that it is inherently egalitarian. Sadly, this is demonstrably untrue: in addition to formidable structural barriers, people of color and women of all economic classes face persistent discrimination and harassment in scientific institutions (Harding 1993; #blackintheivory 2020). Moreover, even if the population of scientists reflected the larger demographics, their elite status impedes efforts to collaborate with grassroots organizers. And finally, international scientific communities have not brought an egalitarian vision to the knowledge possessed by different cultural traditions.

Many radicals today would resist the elitist notion that democratizing science entails enlightening the superstitious masses to render them worthy of modern citizenship. This, however, has long been a core principle of liberal and Marxist science activism. In both liberal-capitalist and state-socialist contexts, science dissemination has also been a useful tool for legitimizing the existing political and economic order (Ezrahi 1990; Schmalzer 2008). Nevertheless, there is still room for science dissemination within a radical democratic politics of science. On a practical level, scientific knowledge is usually helpful and often necessary for social movements to struggle effectively. Moreover, movement participants often experience scientific knowledge as profoundly liberating because it is rational, critical, cosmopolitan, or universal—because it suggests the world is on their side.

The principle that science requires democracy in the form of autonomy for scientists is also tricky. On the one hand, the Saint-Simonian vision animating much liberal discourse cannot

square with commitments to overturn elitism in science and to insist that scientists take responsibility for the politics of their knowledge making. On the other hand, repressive states pose a serious danger to scientists, including many who are contributing to social, economic, political, and ecological justice. The value of academic freedom is also a very powerful (perhaps indispensable) issue around which scientists and other intellectuals can be mobilized by their labor unions or other activist organizations.

To my mind, the elements of this long conversation that speak most powerfully to radical science activism today lie in three areas. First is “science for the people” rather than for the ruling classes; this of course has long been a priority shared by Marxists the world over. Second is anti-imperialist struggle, which some now pursue in the form of “decolonizing science.” Third, is mass science, which informs the more radical varieties of citizen science today (Fan and Chen 2019). More generally, studying this history offers opportunities to expand our imaginative power and sharpen our analytical tools; we will need both as we continue to critically engage the problems of science and democracy for our collective future.

REFERENCES

- Aronova, Elena. 2011. "The politics and contexts of Soviet science studies (Naukovedenie): Soviet philosophy of science at the crossroads."
- Aronova, Elena. 2014. "Big Science and 'Big Science Studies' in the United States and the Soviet Union during the Cold War." In Naomi Oreskes and John Krige, ed. *Science and Technology in the Global Cold War*. Cambridge: MIT Press.
- B. F. [Britta Fischer], "SESPA Tells It Like It Is: Opening Statement AAA\$ 1970," *Science for the People* 3.1 (1971): 6-7.
- Barnes, Joseph. 1934. "Soviet Sinology." *Pacific Affairs* 7.3: 331-33.

- Bernal, J. D. 1967 [1939]. *The Social Function of Science*. Cambridge: MIT Press.
- #blackintheivory. Twitter.com. Accessed 24 July 2020.
- Boisselle, Laila N. "Decolonizing Science and Science Education in a Postcolonial Space." *SAGE Open* 6.1: 1-11.
- Cai Shangsi 蔡尚思. 1961. "'Wu si' qianhou Dong Xi wenhua wenti de da zhenglun 五四前后东西文化问题的大争论" (The Big Debate over the Problem of Eastern and Western Culture during the May Fourth Period). *Xueshu yuekan* 学术月刊 (Academic Monthly) 1961.5: 10-16, 20.
- Chen Duxiu. 1915. "Jinggao qingnian" 敬告青年 (Call to Youth). In *Duxiu wencun* 独秀文存, vol. 1, 1-10. Shanghai: Yadong tushuguan, 1922.
- Chen Duxiu. 1919. "Zuian zhi dabian shu" 罪案之答辩书 (A Defense in the Criminal Case Regarding New Youth). In *Duxiu wencun* 独秀文存, vol. 2, 361-64. Shanghai: Yadong tushuguan, 1922.
- Cholakova, Romyana. 2009. "Chinese Spirit, Russian Soul, and American Materialism: Images of America in Twentieth-Century Chinese and Russian Travelogues". <https://openscholarship.wustl.edu/etd/65/>
- Davis, Chandler. 1972. "Math in China and Vietnam: What Can We Learn?" *Science for the People* 4.2: 19-21.
- Ezrahi, Yaron. 1990. *The Descent of Icarus: Science and the Transformation of Contemporary Democracy*. Cambridge: Harvard University Press.
- Fan, Fa-ti. 2012. "The Global Turn in the History of Science." *East Asian Science, Technology & Society* 6.2: 249-58.
- Fan, Fa-ti and Shun-Ling Chen. 2019. "Citizen, Science, and Citizen Science." *East Asian Science, Technology & Society* 13.2: 181-93.
- Fan Hongye and Li Zhen 类洪业 and 李真. 1989. "Kexuejia dui Wusi xin wenhua yundong de gongxian 科学家对五四新文化运动的贡献" (The Contribution of Scientists to the May Fourth New Culture Movement). *Ziran bianzhengfa tongxun* 自然辩证法通讯 (Journal of Natural Dialectics) 11.3: 41-49.
- Fang Lizhi. 1991. "Patriotism and Global Citizenship." In *Bringing Down the Great Wall*. Translated by James H. Williams, 244-49. New York: Knopf.

- Fed'kin, F. I. 1958. "Legal Questions on the Organization of Scientific Work in the USSR." Originally published in Russian as "Pravovyye Voprosy Organizatsii Nauchnoy Raboty v SSSR" by State Publishing House for Juridical Literature. Translated and published by Joint Publications Research Service, May 29, 1961.
- Fei Xiaotong 费孝通. 2007. *Fei Xiaotong you ji* 费孝通游记 (Fei Xiaotong's Travel Writings). Beijing: Dongfang chubanshe.
- Frolov, I. T. 1975. "Research on Man, Genetic Engineering." Originally published in *Voprosy Filosofii*. Translated and published by Joint Publications Research Service, December 5, 1975.
- Gorky, Maxim [Gao'erji] (高尔基). 1978A [1917]. "Kexue yu minzhu 科学与民主" (Science and Democracy). *Jiangxi shiyuan xuebao (ziran kexue ban)* 江西师院学报 (自然科学版) (Journal of Jiangxi Normal University, Natural Sciences Edition) 1978.1: 8-11.
- Gorky, Maxim [Gao'erji]. 1978b [1917]. "Kexue yu minzhu" [Science and Democracy]. *Ziran zazhi* 1.8 (1978): 473-74, 478.
- Gorky, Maksim. 1995 [1970]. *Untimely Thoughts: Essays on Revolution, Culture and the Bolsheviks, 1917-1918*. Yale UP.
- Hachten, Elizabeth A. "In Service to Science and Society: Scientists and the Public in Late-Nineteenth-Century Russia." *Osiris* 17 (2002): 171-209.
- Harding, Sandra, ed. 1993. *The "Racial" Economy of Science: Toward a Democratic Future*. Indiana University Press.
- Heilmann, Sebastian. 2008. "From Local Experiments to National Policy: The Origins of China's Distinctive Policy Process." *The China Journal* 59:1-30.
- Hu, Qiaomu 胡乔木. 1981. "Jiaqiang sixiang jiben yuanze de xuanchuan" 加强四项基本原则的宣传 (Strengthening propaganda on the four cardinal principles). In *Hu Qiaomu wenji* 胡乔木文集 (Collective works of Hu Qiaomu), vol. 3, 143-55. Beijing: Renmin chubanshe.
- Hu, Qiaomu 胡乔木. 1983. "Zai quanguo xuanchuan gongzuo huiyi shang de jianghua" 在全国宣传工作会议上的讲话 (Speech at the national conference on propaganda work). *Xuanchuang dongtai* 宣传动态 (Propaganda dynamics) 1983: 266-91.
- Huang Yuanqi 黄元起. 1957. "1923 nian de kexue yu xuanxue de lunzhan" 1923 年的科学与玄学的论战 (The 1923 Debate over Science and Metaphysics). *Shixue yuekan* 史学月刊 1957.9: 8-12.

- Irwin, Alan and Brian Wynne. 1996. *Misunderstanding Science? The Public Reconstruction of Science and Technology*. New York: Cambridge University Press.
- Jasanoff, Sheila. 2011. *Designs on Nature: Science and Democracy in Europe and the United States*. Princeton: Princeton University Press.
- Jasanoff, Sheila. 2017. "Science and Democracy." In *The Handbook of Science and Technology Studies*. Edited by Ulrike Felt, Rayvon Fouché, Clark A. Miller, and Laurel Smith-Doerr, 259-87. Cambridge: MIT Press.
- Ji Chao 吉超. 2003. "Qianlun 'kexue yu minzhu bing zhong' 浅论“科学与民主并重”的口号" (Reflecting on the Slogan 'Give Equal Emphasis to Science and Democracy'). *Zhaotong shifan gaodeng zhuanke xuexiao xuebao* 昭通师范高等专科学校学报 25.1: 57-60.
- Kojenikov, Alexei. 2002. "The Great War, the Russian Civil War, and the Invention of Big Science." *Science in Context* 15.2: 239-75.
- Kojevnikov, Alexei. 2008. "The Phenomenon of Soviet Science." *Osiris* 23: 115-35.
- Kuo, Thomas C. T. 1975. *Ch'en Tu-hsiu (1879-1942) and the Chinese Communist Movement*. South Orange, N.J.: Seton Hall University Press.
- Li Longmu, "Lun 'Wusi' xin wenhua yundong jiqi tongji zhanxian," *Lishi yanjiu* 1962.2: 14-15.
- Li Xingmin 李醒民. 2010. "科学与民主、自由和国际主义." *Shandong keji daxue xuebao: shehui kexue ban* 12.2: 1-8.
- Li Zehou 李泽厚. 1979. *Zhongguo jindai sixiang shi lun* 中国近代思想史论 (The History of Modern Chinese Thought). Beijing: Renmin chubanshe.
- MacLeod, Roy. 1997. "Science and Democracy: Historical Reflections on Present Discontents." *Minerva* 35.4: 369-84.
- Mao Zedong. 1965 [1940]. "On New Democracy." In *Selected Works of Mao Tse-tung, vol. 2*, 339-84. Peking: Foreign Languages Press.
- Mao Zedong. 1965 [1942]. "Oppose Stereotyped Party Writing." In *Selected Works of Mao Tse-tung, vol. 3*, 53-68. Peking: Foreign Languages Press.
- Miller, Alice L. (H. Lyman). 1996. *Science and Dissent in Post-Mao China: The Politics of Knowledge*. Seattle: University of Washington Press.
- Needham, Joseph. 1946. "On Science and Social Change." *Science & Society* 10.3: 225-51.

- McEwan, Purr. 1975. "Imperialism: The Common Enemy." *Science for the People* 7.4: 6-13.
- Merton, Robert K. 1942. "A Note on Science and Democracy." *Journal of Legal and Political Sociology* 1: 115-26.
- Moore, Kelly. 2008. *Disrupting Science: Social Movements, American Scientists, and the Politics of the Military, 1945-1975*. Princeton: Princeton University Press.
- Nakayama, Shigeru. 1974. *Science and Society in Modern Japan*. Tokyo: University Press.
- Nakayama, Shigeru. 1991. *Science, Technology, and Society in Postwar Japan*. London: Kegan Paul International.
- Ogden, Suzanne. 1982. "The Sage in the Inkpot: Bertrand Russell and China's Social Reconstruction in the 1920s." *Modern Asian Studies* 16.4: 529-600.
- Olwell, Russell. 1996. "'Condemned to Footnotes': Marxist Scholarship in the History of Science." *Science & Society* 60.1: 7-26.
- Perry, Samuel. 2014. *Recasting Red Culture in Proletarian Japan: Childhood, Korea, and the Historical Avant-Garde*. Honolulu: University of Hawai'i Press.
- Platonov, G. 2001 (1955). *Kliment Arkadyevich Timiryazev Timiryazev*. Honolulu: University Press of the Pacific.
- Popper, Karl. 1950. *The Open Society and Its Enemies*. Princeton: Princeton University Press.
- Price, Don K. 1965. *The Scientific Estate*. Cambridge: Harvard University Press.
- Qu Qiubai [Qu Weita]. 1923. "Dongfang wenhua yu shijie geming 东方文化与世界革命" (Eastern Culture and World Revolution). *Xin qingnian* 新青年(New Youth) 10.1: 67-86.
- Reisch, George. 2014. "When Structure Met Sputnik: On the Cold War Origins of The Structure of Scientific Revolutions." In *Science and Technology in the Global Cold War*. Edited by Oreskes and Krige, 371-92. Cambridge: MIT Press.
- Schaffer, Simon. 1984. "Newton at the Crossroads." *Radical Philosophy* 37: 23-28.
- Schmalzer, Sigrid, Daniel Chard and Alyssa Botelho, eds. 2018. *Science for the People: Documents from America's Movement of Radical Scientists*. Amherst: University of Massachusetts Press.
- Schwarcz, Vera. 1992. *Time for Telling Truth is Running Out: Conversations with Zhang Shenfu*. New Haven: Yale University Press.

- Schwartz, Benjamin. 1964. *In Search of Wealth and Power: Yen Fu and the West*. Cambridge: Belknap Press of Harvard University Press.
- Schwartz, Benjamin. 1968. *Chinese Communism and the Rise of Mao*. Cambridge: Harvard University Press.
- Seymour, James D. 1986. "China's Satellite Parties Today." *Asian Survey* 26.9: 991-1004.
- Sigerist, Henry E. 1938. "Science and Democracy." *Science & Society*. 2.3: 291-99.
- Star, Susan Leigh and James Griesemer. 1989. "Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39." *Social Studies of Science* 19.3: 387-420.
- Turner, Stephen. 2007. "Merton's 'Norms' in Political and Intellectual Context," *Journal of Classical Sociology* 7.2: 161-78.
- Wagner, Rudolph. 1985. "Lobby Literature: The Archeology and Present Functions of Science Fiction in China." In *After Mao: Chinese Literature and Society, 1978-1981*. Edited by Jeffrey Kinkley. Cambridge: Harvard University Press.
- Wang Gungwu. 1979. "May Fourth and the GPCR: The Cultural Revolution Remedy," 674-90.
- Wang, Jessica. 1999. "Merton's Shadow: Perspectives on Science and Democracy since 1940." *Historical Studies in the Physical and Biological Sciences* 30.1: 279-306.
- Wang, Jessica Ching-Sze. 2007. *John Dewey in China: To Teach and to Learn*. SUNY Press.
- Wang, Zuoyue. 2002. "Saving China through Science: The Science Society of China, Scientific Nationalism, and Civil Society in Republican China." *Osiris* 17: 291-322.
- Werskey, Gary. 1988. *The Visible College: A Collective Biography of British Scientists and Socialists of the 1930s*. London: Free Association.
- Xu Liangying 许良英. 1981. "Shilun kexue he minzhu de shehui gongneng 试论科学和民主的社会功能" (On the Role of Science and Democracy in Society). *Ziran bianzhengfa tongxun 自然辩证法通讯* 1981.1: 3-6.
- Xu Liangying 许良英 and Fan Dainian 范岱年. 1957. *Kexue he woguo shehuizhuyi jianshe 科学和我国社会主义建设* (Science and China's Socialist Construction). Beijing: Renmin chubanshe.

Zachariah, Mathai and R Sooryamoorthy. 1994. *Science for Social Revolution: Achievements and Dilemmas of a Development Movement: The Kerala Sastra Sahitya Parishad*. London: Zed Books.

Zhang Shenfu 张申府. 1942. 科学与民主——为纪念五四写的. 新华日报.

Zhang Ximan 张西曼. 2015 [1945]. “‘Minzhu’ yu ‘kexue’ shi Zhongguo geming de liang da mubiao” “民主”与“科学”是中国革命的两大目标 (“Democracy” and “Science” are the Two Big Goals of the Chinese Revolution). *Minzhu yu kexue* 民主与科学 2015.5: 59-61.