The Peril of Politicizing Science

It’s a beautiful thing, the destruction of words. Don’t you see that the whole aim of Newspeak is to narrow the range of thought? In the end we shall make thoughtcrime literally impossible, because there will be no words in which to express it.

—George Orwell, 1984

I grew up in a city that in its short history (barely over 150 years) had its name changed three times.2,3 Founded in 1869 around a steel plant and several coal mines built by the Welsh industrialist John Hughes, the settlement was originally called Hughesovka (or Yuzovka). When the Bolsheviks came to power in the 1917 Revolution, the new government of the working class, the Soviets, set out to purge the country of influences in the name of the proletariat and the worldwide struggle of the suppressed masses. Cities and geographical landmarks were renamed,4 statues were torn down, books were burned, and many millions were jailed and murdered.5 In due course, the commissars got to Yuzovka, and the city was stripped of the name of its founder, a representative of the hostile class of oppressors and a Westerner. In modern terms, Hughes was canceled. For a few months, the city was called Trotsk (after Leon Trotsky), until Trotsky lost in the power struggle inside the party and was himself canceled (see Figure 1). In 1924 the city became the namesake of the new supreme leader of the Communist Party (Stalin), and a few years later renamed to Stalino. My mother’s school certificates have Stalino on them. Following Stalin’s death in 1953, the Communist party underwent some reckoning and admitted that several decades of terror and many millions of murdered citizens were somewhat excessive. Stalin was canceled: his body was removed from the Mausoleum at Red Square (where it had been displayed next to Lenin’s); textbooks and encyclopedias were rewritten once again; and the cities, institutions, and landmarks bearing his name were promptly renamed. Stalino became Donets, after the river Severskii Donets.

I came of age during a relatively mellow period of the Soviet rule, post-Stalin. Still, the ideology permeated all aspects of life, and survival required strict adherence to the party line and enthusiastic displays of ideologically proper behavior. Not joining a young communist organization (Komsomol) would be career suicide—nonmembers were barred from higher education. Openly practicing religion could lead to more grim consequences, up to imprisonment. So could reading the wrong book (Orwell, Solzhenitsyn, etc.). Even a poetry book that was not on the state-approved list could get one in trouble.

Mere compliance was not sufficient—the ideology committee members were constantly on the lookout for individuals whose support of the regime was not sufficiently enthusiastic. It was not uncommon to get disciplined for being too quiet during mandatory political assemblies (politinformation or komso-mol’skoe sobranie) or for showing up late to mandatory mass-celebrations (such as the May or November demonstrations). Once I got a notice for promoting an imperialistic agenda by showing up in jeans for an informal school event. A friend’s dossier was permanently blemished—making him ineligible for Ph.D. programs—for not fully participating in a trip required of university students: an act of “voluntary” help to comrades in collective farms (Figure 2).

Science was not spared from this strict ideological control.6 Western influences were considered to be dangerous. Textbooks and scientific papers tirelessly emphasized the priority and pre-eminence of Russian and Soviet science. Entire disciplines were declared ideologically impure, reactionary, and hostile to the cause of working-class dominance and the World Revolution. Notable examples of “bourgeois pseudoscience” included genetics and cybernetics. Quantum mechanics and general relativity were also criticized for insufficient alignment with dialectic materialism.

Most relevant to chemistry was the antiresonance campaign (1949–1951).7 The theory of resonating structures, which brought Linus Pauling the Nobel prize in 1954, was deemed to be bourgeois pseudoscience. Scientists who attempted to defend the merits of the theory and its utility for understanding chemical structures were accused of “cosmopolitism” (Western sympathy) and servility to Western bourgeois science. Some lost jobs. Two high-profile supporters of resonance theory, Syrkin and Dyatkina, were eventually forced to confess their ideological sins and to publicly denounce resonance. Meanwhile, other members of the community took this political purge as an opportunity to advance at the expense of others.7,8 As noted by many scholars,7,8 including Pauling himself,9 the grassroots antiresonance campaign was driven by people who were “displeased with the alignment of forces in their science”. This is a recurring motif in all political campaigns within science in Soviet Russia, Nazi Germany, and McCarthy’s America—those who are “on the right side” of the issue can jump a few rungs and take the place of those who were canceled. By the time I studied quantum chemistry at Moscow State University, the theory of resonating structures seemed to have been definitively canceled.
State University, resonance theory had been rehabilitated. Yet, the history of the campaign and the injustices it entailed were not discussed in the open—the Party did not welcome conversations about its past mistakes. I remember hearing parts of the story, narrated under someone’s breath at a party after copious amounts of alcohol had loosened a tongue.

Fast forward to 2021—another century. The Cold War is a distant memory and the country shown on my birth certificate and school and university diplomas, the USSR, is no longer on the map. But I find myself experiencing its legacy some thousands of miles to the west, as if I am living in an Orwellian twilight zone. I witness ever-increasing attempts to subject science and education to ideological control and censorship. Just as in Soviet times, the censorship is being justified by the greater good. Whereas in 1950, the greater good was advancing the World Revolution (in the USSR; in the USA the greater good meant fighting Communism), in 2021 the greater good is “Social Justice” (the capitalization is important: “Social Justice” is a specific ideology, with goals that have little in common with what lower-case “social justice” means in plain English).\(^\text{10−12}\) As in the USSR, the censorship is enthusiastically imposed also from the bottom, by members of the scientific community, whose motives vary from naive idealism to cynical power-grabbing.

Just as during the time of the Great Terror\(^\text{5,13}\), dangerous conspiracies and plots against the World Revolution were seen everywhere, from illustrations in children’s books to hairstyles and fashions; today we are told that racism, patriarchy, misogyny, and other reprehensible ideas are encoded in our textbooks rewritten to obliterate the canceled.\(^\text{4}\)

As an example of political censorship and cancel culture, consider a recent viewpoint\(^\text{1,6}\) discussing the centuries-old tradition of attaching names to scientific concepts and discoveries (Archimede’s Principle, Newton’s Laws of Motion, Schrödinger equation, Curie Law, etc.). The authors call for vigilance in naming discoveries and assert that “basing the name with inclusive priorities may provide a path to a richer, deeper, and more robust understanding of the science and its advancement.” Really? On what empirical grounds is this based? History teaches us the opposite: the outcomes of the merit-based science of liberal, pluralistic societies are vastly superior to those of the ideologically controlled science of the USSR and other totalitarian regimes.\(^\text{17}\) The authors call for removing the names of people who “crossed the line” of moral or ethical standards. Examples\(^\text{16}\) include Fritz Haber, Peter Debye, and William Shockley, but the list could have been easily extended to include Stark (defended expulsion of Jews from German institutions),\(^\text{18}\) Heisenberg (led Germany’s nuclear weapons program),\(^\text{19}\) and Schrödinger (had romantic relationships with under-age girls).\(^\text{19}\) Indeed, learned societies are now devoting considerable effort to such renaming campaigns—among the most-recent cancellations is the renaming of the Fisher Prize by the Evolution Society, despite well-argued opposition by 10 past presidents and vice-presidents of the society.\(^\text{10}\)

There is no doubt that many famous scientists had views or engaged in behaviors that, by today’s standards, are not acceptable.\(^\text{21}\) Their scientific legacies are often mixed; for example, Fritz Haber is both the father of modern chemical warfare and the man whose development of nitrogen fixation is feeding the planet.\(^\text{22}\) Scientists are not saints.\(^\text{21}\) They are human beings born into places and times they did not choose. Just as their fellow human beings do, each finds his or her way though the circumstances of their lives, such as totalitarian regimes, world wars, and revolutions. Sometimes they made the right choices, sometimes they erred. Some paid dearly for their mistakes. Haber\(^\text{22}\) was an avid German patriot, to the extent that he actively developed chemical weapons in order to provide Germany with military advantage. Yet, his motherland rejected him because he was a Jew. He was barely able to escape Germany, and part of his extended family perished in the concentration camps. As eloquently stated by Stern in his essay,\(^\text{22}\) are we really so morally superior that we can “judge a

Figure 1. Soviet history was constantly revised to keep up with the current party line. Historic photographs were routinely airbrushed and textbooks rewritten to obliterate the canceled.\(^\text{4}\) Left: Lenin speaking in Moscow to Red Army soldiers in 1920, with Leon Trotsky and Lev Kamenev standing to his left side, on the steps to the right. Right: Same scene, with Trotsky and Kamenev airbrushed out, after they were canceled. Once the heroes of the Revolution, they had become traitors and enemies of the people. (Photograph May 5, 1920, by G. P. Goldshtein. Part of the David King Collection. Purchased from David King by Tate Archive 2016. Photo copyright Tate.)
The authors of the viewpoint acknowledge historic complexities and the fact that moral and ethical standards change with time. They backed off Debye’s cancellation, quoting the decisions of investigative committees that concluded that Debye did not cross the line. However, they demand that the “Shockley—Queisser limit” be renamed. They call for Shockley’s cancellation as punishment for his abhorrent views on issues far outside his domain of expertise, such as race, gender, and IQ. If, for the sake of argument, we divorce ourselves from the charged political content of Shockley’s publications on these topics, we can compare his minimal scholarly contribution in this domain to Pauling’s vitamin C debacle. Should we cancel Pauling for overstepping the domain of his competence and making medically dangerous claims? Which one is the greater misconduct—publishing a paper with eugenic content or promoting vitamin C as a cure for cancer? Note that in the case of both Pauling and Shockley, the Mertonian principle of organized skepticism has already taken care of effectively separating the wheat from the chaff: while Shockley’s detailed balance paper (ref 11 in the viewpoint) is cited almost 7000 times, his paper on race and IQ (ref 12 in the viewpoint) has a grand total of 15 citations. Digging deeper into the Shockley case, many of his biographers attribute his well-documented antisocial traits and behaviors (social withdrawal and paranoia) to a mental disorder and describe him as a high-functioning autistic. In his book *The Gene*, Mukherjee uses Shockley to illustrate the ethical conundrums of gene editing, by pointing out that the same combination of genes can be both “genius-enabling” and “disease-enabling”. What if Shockley’s deplorable views were the result of his mental disorder? Should we cancel him anyway? I think we should discuss his mixed legacy and learn from his complicated story, in the same way we can learn from Fritz Haber’s and others’. These stories can teach us about the complexity of the world and of human minds, the importance of tolerance and empathy. And we should leave the Shockley—Queisser limit (and other named discoveries and equations) alone.

The issue of science moralization and censorship is older than 20th century totalitarian regimes. For example, Giordano Bruno was canceled (burned at the stake in 1600) because his cosmological views were considered to be a threat to the dominant ideology. The guardians of the truth, his prosecutors, “had the desire to serve freedom and promote the common good”. A century later, Leeuwenhoek self-censored his studies and reports for offensive content (observations of spermatozoa in semen). In 1911, Marie Curie was ostracized for immoral behavior—an affair with a married man (Langevin) following the tragic death of her husband Pierre Curie. The chair of the Nobel Prize committee, Svante Arrhenius, wrote to her advising that she not attend the official ceremony for her Nobel Prize in Chemistry in view of her questionable moral standing. Curie replied that she would be present at the ceremony, because “the prize has been given to her for her discovery of polonium and radium” and that “there is no relation between her scientific work and the facts of her private life”. Today we regard this attempt to cancel Curie on the grounds of her moral impurity as utterly absurd, yet we continue to witness the intrusion of moral arguments into the scientific domain.

Examples of past cancellations done in the name of maintaining moral purity (as understood at the time) provide a useful context for today’s struggle between free speech and
cancel culture. In 1952, Alan Turing was canceled for being gay. After he was convicted for “gross indecency” and subjected to chemical castration, he lost his consultancy job for the British intelligence agency, despite his vital contributions to the war effort, and was denied entry to the United States. About the same time, the University of Minnesota revoked an offer from Michael McConnell for his intent to marry another man. McConnell sued, but lost, with the judge decrying same-sex marriage a “socially repugnant concept,” incompatible with holding a university position.

Today’s censorship does not stop at purging the scientific vocabulary of the names of scientists who “crossed the line” or fail the ideological litmus tests of the Elect. In some schools, physics classes no longer teach “Newton’s Laws”, but “the three fundamental laws of physics”. Why was Newton canceled? Because he was white, and the new ideology calls for “decentering whiteness” and “decolonizing” the curriculum. A comment in Nature calls for replacing the accepted technical term “quantum supremacy” by “quantum advantage”. The authors regard the English word “supremacy” as “violent” and equate its usage with promoting racism and colonialism. They also warn us about “damage” inflicted by using such terms as “conquest”. I assume “divide-and-conquer” will have to go too. Remarkably, this Soviet-style ghost-chasing gains traction. In partnership with their Diversity, Equity, and Inclusion taskforce, the Information and Technology Services Department of the University of Michigan set out to purge the language within the university and without (by imposing restrictions on university vendors) from such hurtful and racist terms as “picnic”, “brown bag lunch”, “black-and-white thinking”, “master password”, “dummy variable”, “disabled system”, “grandfathered account”, “strawman argument”, and “long time no see.” The list is not exhaustive and will continue to grow, warns the memo. Indeed, new words are canceled every day—I just learned that the word “normal” will no longer be used on Dove soap packaging because “it makes most people feel excluded” (emphasis mine; see Figure 3).

Do words have life and power of their own? Can they really cause injury? Do they carry hidden messages? The ideology claims so and encourages us all to be on the constant lookout for offenses. If you are not sure when you should be offended—check out the list of microaggressions—a quick google search can deliver plenty of official documents from serious institutions that, with a few exceptions, sound like a sketch for the next Borat movie. If nothing fits the bill, you can always find malice in the sounds of a foreign language. At the University of Southern California, a professor was recently suspended because students claimed to have been offended by the sounds of Chinese words used to illustrate the concept of filler words in a communications class.

Why did I devote a considerable amount of my time to writing this essay? After all, I am no fan of Shockley, his eugenic views disgust me. Notwithstanding his monumental contributions to one of the most pressing problems we face—harnessing solar energy—I would not want to sit next to him at a dinner party. Yet, the term “Shockley—Queisser limit” elicits no emotional response in me. Neither does “Stark effect”, “Haber—Bosch process”, or “Debye units”. To most scientists, these are convenient labels, which remind us that the cathedrals of science are built by mere mortals, and not some deeply meaningful symbols of reverence. So why should we not humor those who claim to feel differently and rename everything in sight? After all, renaming equations is even easier than renaming cities, buildings, or landmarks.

The answer is simple: our future is at stake. As a community, we face an important choice. We can succumb to extreme left ideology and spend the rest of our lives ghost-chasing and witch-hunting, rewriting history, politicizing science, redefining elements of language, and turning STEM (science, technology, engineering, and mathematics) education into a farce. Or we can uphold a key principle of democratic society—the free and uncensored exchange of ideas—and continue our core mission, the pursuit of truth, focusing attention on solving real, important problems of humankind.

The lessons of history are numerous and unambiguous. Despite vast natural and human resources, the USSR lost the Cold War, crumbled, and collapsed. Interestingly, even the leaders of the most repressive regimes were able to understand, to some extent, the weakness of totalitarian science. For example, in the midst of the Great Terror, Kapitsa and Ioffe were able to convince Stalin about the importance of physics to military and technological advantage, to the extent that he reversed some arrests; for example, Fock and Landau were set free (however, an estimated ~10% of physicists perished during this time). In the late forties, after nuclear physicists explained that without relativity theory there will be no nuclear bomb, Stalin rolled back the planned campaign against physics and instructed Beria to give physicists some space; this led to significant advances and accomplishments by Soviet scientists in several domains. However, neither Stalin nor the subsequent Soviet leaders were able to let go of the controls completely. Government control over science turned out to be a grand failure, and the attempts to patch the widening gap between the West and the East by espionage did not help.

Today Russia is hopelessly behind the West, in both technology and quality of life. The book Totalitarian Science and Technology provides many more examples of such failed experiments.

Today, STEM holds the key to solving problems far more important than the nuclear arms race: reversing climate change, fighting global hunger and poverty, controlling pandemics, and harnessing the power of new technologies (quantum computing, bioengineering, and renewable energy) for the benefit of humanity.

Figure 3. Headline of the New York Times article from 2021-03-13. The word “normal” will be removed from more than 200 beauty products. “The changes were long overdue and ‘completely necessary’...”, said Ateh Jewel, a beauty journalist and an advisory board member of the British Beauty Council.”

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Normalizing ideological intrusion into science and abandoning Mertonian principles\textsuperscript{24} will cost us dearly. We cannot afford it.

Anna I. Krylov \(\text{orcid.org/0000-0001-6788-5016}\)

**AUTHOR INFORMATION**

Complete contact information is available at:
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**Notes**

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(14) Diversity & inclusion syllabus statements at Brown university. https://www.brown.edu/sheridan/teaching-learning-resources/inclusive-teaching/statements (accessed 2021-03-21). An example DEI statement from a course syllabus: “In an ideal world, science would be objective. However, much of science is subjective and is historically built on a small subset of privileged voices. I acknowledge that the readings for this course, including the course reader and BCP were authored by white men. Furthermore, the course often focuses on historically important neuroscience experiments which were mostly conducted by white men.”
(15) Antiracist pedagogy: YALE Poorvu Center for teaching and learning. https://poorvucenter.yale.edu/Antiracist-Pedagogy (accessed 2021-03-21). Recommendations include “decentering Whiteness in the course content” and “creating assessments that enable students to demonstrate different knowledge and ways of knowing”. Examples of good practices include “Yale Associate Professor of Computer Science … includes discussions about the discriminatory racial history of computer science and mathematics as a way to help students understand the politics and power of fields that are often thought of as being objective.”
(24) Wikipedia article about R. K. Merton. https://en.wikipedia.org/wiki/Robert_K._Merton. Merton defined a set of ideals that he considered to be integral to the goals and methods of science and binding to scientists. The Mertonian norms of science, which are often referred to by the acronym “CUDOS”, include the following: (i) Communism: the common ownership of scientific discoveries, according to which scientists give up intellectual property in exchange for recognition; (ii) Universalism: according to which claims to truth are evaluated in terms of universal or impersonal criteria, and not on the basis of race, class, gender, religion, or nationality; (iii) Disinterestedness: according to which scientists are rewarded for acting in ways that outwardly appear to be self-less; and (iv) Organized Skepticism: all ideas must be tested and are subject to rigorous, structured community scrutiny.
(28) Wikipedia article about Giordano Bruno. https://en.wikipedia.org/wiki/Giordano_Bruno. In 2000, Cardinal Sodano referred to Bruno’s death as a “sad episode” but defended the Inquisitors who “had the desire to serve freedom and promote the common good and did everything possible to save his life”.
(30) Popprick, L. The long, winding tale of sperm science. *Smithsonian*; 2017; https://www.smithsonianmag.com/science-nature/scientists-finally-unravel-mysteries-sperm-180963578. When Leeuwenhoek wrote to the Royal Society of London about his discovery of spermatozoa in 1677, he preceded his report with the following: “If your Lordship should consider that these observations may disgust or scandalise the learned, I earnestly beg your Lordship to regard them as private and to publish or destroy them as your Lordship sees fit.”
(34) Somerville, E. Isaac Newton latest historical figure swept up in ‘decolonisation’ drive. The Telegraph, 2021; https://www.telegraph.co.uk/news/2021/04/24/isaac-newton-latest-historical-figure-swept-decolonisation-drive. A draft of “inclusive curriculum development” at the Sheffield University (UK) states that Dirac, Laplace, Newton, and Leibniz “could be considered as benefiting from colonial era activity” and, therefore, should be removed from the engineering curriculum. “Decolonising the curriculum is an ongoing process which prompts us to incorporate historically marginalised or suppressed knowledge into all disciplines...so all our students have the opportunity to see themselves reflected in what they are being taught,” said a spokesman of the University.
(38) Examples of microagressions and recommendations on inclusive language from University of California, University of Colorado, University of Minnesota, and University of Michigan; retrieved from internet. https://drive.google.com/drive/folders/1n6jB4oTDnrPqqKNVAKhA_MNwbK3TBGg; Link to exhibits, 2020.
(39) Soave, R. USC suspended a communications professor for saying a Chinese word that sounds like a racial slur; Reason, 2020; https://reason.com/2020/09/03/usc-greg-patton-chinese-word-offended-students.
(41) A pathway to equitable math instruction: Resources and guidance to support Black, LatinX, and multilingual students to thrive in grades 6−8. https://equitablemath.org. From the website: “A Pathway to Equitable Math Instruction is an actionable toolkit designed to support equitable access to math standards for Black, Latinx, and multilingual students in grades 6−8. We invite school leaders, educators, and advocates to join us at these virtual opportunities to dive deeper into each of the toolkit strides.” The program, which is supported by numerous educational boards and foundations, including Los Angeles County Office of Education and Bill and Melinda Gates foundation, calls to “dismantle white supremacy” in the classroom, which manifests itself by “the focus is on getting the ‘right’ answer” and asking students “to show their work”.
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