Excursions in Criticality: Education, Cultural Studies and Politics

Science, Democracy, and the University

John A. Weaver

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By

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To Barry, Teresa, and Dan, the fruits of our baseball and books tour are many

For those who rather condescendingly ghost someone than communicate.

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ABOUT THE AUTHOR

John A. Weaver is a professor of curriculum studies at Georgia Southern University. He is the author of Science, Democracy, and Curriculum Studies, and Educating the Posthuman plus numerous journal articles in various journals including *Taboo, JCT, International Review of Qualitative Research, Educational Philosophy and Theory*, and *Cultural Studies ↔Critical Methodologies.*

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FOREWORD

By Nicholas Ng-A-Fook

The moment in which John Weaver's *Science, Democracy, and the University* enters our public landscape is fraught with immense challenges and contradictions. Across the globe, a cascade of crises—climate change, pandemics, the erosion of democratic norms, the rise of authoritarianism, and the rapid evolution of artificial intelligence (AI)—test our collective capacity to uphold justice, equality, and intellectual freedom. These challenges do not simply emerge in isolation but intersect, each amplifying the urgency of the others. Within this nexus of crises, Weaver's work offers a vital critique of the entanglement of science, democracy, and the university, illuminating how they might still serve as educational foundations for a more equitable, just, and sustainable future.

In Ukraine, the ongoing war has brought drone warfare to the forefront, illustrating the double-edged nature of technoscientific progress. Drones, products of sophisticated scientific advancements, have become tools of destruction as well as instruments of intelligence gathering and defense. Their potential autonomous deployment raises critical ethical questions about the boundaries of technological innovation and scientific inventions. How should science and technology be regulated in the service of humanity rather than its devastation? Weaver's reflections on science as a pharmakon—both a potential cure and poison—resonate powerfully here. His thinking, and curriculum theorizing put forth as a third curriculum, challenges us to scrutinize the systems and institutions that prioritize profit, power, domination, or university rankings over a vocational calling to serve the common good. Drawing on Stengers' scholarship, he reminds us that what is at stake is not simply a defense of academic institutions as they currently exist but a radical reimagining of what they could be—open, inclusive, and committed to the public good. "Slow science is," as Weaver reminds us, "not a revolution in science as Galileo's or Copernicus' work were," rather "it is a reordering of values in science that moves away from

capitalist motives steeped in productivity, secrecy, manipulation, and utility and toward contemplation, reflection, and diplomacy."

In the United States, the presidential election and ensuing executive orders have underscored the deep fissures in democratic governance both at home and abroad. The stakes over the next 4 years extend beyond one political party's dogged governmental dominance. Indeed, as Weaver makes clear, they touch the very heart of democracy itself. In response, Weaver draws from Derrida's concept of a democracy to come, stressing that democracy is not a finished project but rather a recursive striving, of a promise yet to be fulfilled. "In the end as Derrida notes we need," as he maintains "a certain amount of faith," and "a certain amount of honesty which is so rare to come by in the United States." In turn, Weaver calls for a vision of democracy, an enactment, which demands continual critique and self-reflection from this current moment of scientific, dare I say societal, sleepwalking. Such honest and transparent forms of critique, of slowing down, are made more difficult in a social media algorithmic landscape rife with misinformation, dismissing scientific findings as fake news, the gerrymandering of voter suppression, and eroding trust in our public institutions. Drawing on the scholarship of Stiegler, Weaver's analysis extends beyond democracy's fragility to the university's complicity in its erosion. Historically, the university has been both a site of radical critique and a bastion of privilege, exclusion, and corporate entanglement. Today, it stands at a crossroads as Weaver aptly illustrates across the different chapters of this book. On the one hand, universities are increasingly shaped by neoliberal logics that prioritize market efficiency, productivity, and immediate utility over deep inquiry and intellectual freedom. On the other, they remain one of the few spaces where critical thought, social movements, and new forms of knowledge production can potentially take root as part of what he calls ecologies of practices outside of the university's increasingly corporatized laboratories.

The danger, as Weaver and Serres both warn, lies in the monopolization of thought by the exact sciences, where science becomes not just a method of inquiry but the sole arbiter of truths. This epistemic closure is particularly evident in the rise of algorithmic governance and AI, where statistical models increasingly dictate social policies, criminal justice decisions, precision medicine, and even educational curricula (Chun, 2021). In such a world, for Weaver, literature, history, and philosophy risk becoming *dead letters*, and their spaces for critique erased in favor of data-driven rationalities that leave little room for dissent or alternative visions of the future. Generative AI, its architectural engineering, and the technoeconomics of its supporting superchips, cloud empires, and data management centers, mark another hallmark of our age, mirroring, surveilling, extracting, and commodifying our very interconnected embodiments as data, as biopower, at the expense of the planet (Couldry & Mejias, 2019).

While AI has the potential to revolutionize fields like education, precision medicine, and scientific research, the new empire of AI, this fourth industrial revolution, also poses existential risks (Adams, 2025). "If historical colonialism expanded by appropriating for exploitation geographical territory and resources that territorial conquest could bring, data colonialism expands by appropriating for exploitation ever more layers of," as Couldry and Mejias (2019) warn, "*human life* itself" (p. 5). AI's rapid development, its coming industrial wave, has raised questions about equity, accessibility, privacy, and the loss of human creativity (Suleyman & Bhaskar, 2023). Consequently, Weaver's insistence on opening science and the university to broader, more inclusive participation is a necessary counterpoint to the elitism that often pervades scientific research and technological innovations. For AI to serve the public good, it must be integrated into society in ways that promote transparency, justice, and collective well-being for humanity and the more-than-human worlds (Phillips & Ng-A-Fook, 2024). And yet, in terms of a future to come, its contributions to serving the public good, we shall see what versions of its socially networked relations are yet to come as a democracy still in-the-making.

The global rightward shift in politics compounds these challenges. Across nations, movements driven by nationalism, xenophobia, and kleptocratic authoritarianism have emerged, often undermining scientific expertise and democratic norms. Climate denialism, for example, persists not because of a lack of evidence but due to deliberate political and economic strategies that prioritize short-term gains over long-term planetary health. Similarly, during the COVID-19 pandemic, vaccine denialism thrived on misinformation and mistrust, endangering millions and exposing the fragility of public health systems. Certainly, during the pandemic several individuals profited from the corporate pharmaceutical—vaccinated—industry. In response to such profiteering technoscientific contexts, Weaver's critique of science and democracy as interdependent yet vulnerable systems are both timely and essential. His call for a more inclusive and democratic approach to science, and its public education, of educating the public, underscores the need to rebuild trust and foster public engagement in terms of present and future mobilizing forms of knowledge production in relation to creating and networking alternative ecologies of practices.

In the United States, and here in Canada, the university remains a battleground for competing ideologies and respective culture wars. States like Florida, Georgia, and Texas have enacted policies banning textbooks that address race, gender, and systemic inequalities, actions that threaten the very principles of academic freedom. Executive orders, and the Supreme Court, have and are seeking to extinguish affirmative actions, diversity, equity, and inclusive policies from the governmental discursive regimes symbolic and material hard drives. Often framed as parental rights, electoral voters rights, these bans are part of a broader trend of censorship

and anti-intellectualism, that seeks to limit certain lines of curriculum inquiry; of formulating different questions. As Weaver notes, the university is not merely a space for knowledge production but a site for cultivating and nourishing the intellectual and ethical habits necessary for a thriving democracy, of one still to come. Here, Weaver's invocation of Derrida's concept of aporia—the contradictions and impasses inherent in systems like the university—offers a potential way to navigate the attacks on universities. Rather than shy away from the tensions between academic freedom and public accountability, Weaver challenges us to inhabit these contradictions as spaces of critical possibilities to think and live otherwise. The university, he argues, must resist the pressures of commodification and utility, embracing instead its role as a public space for imagining the world otherwise and an openness to ensuing critiques.

Central to Weaver's argument is a reimagining of science, inspired in part by Max Planck's reflections on science as a vocation. Planck, a foundational figure in modern physics, envisioned science, as Weaver stresses, not merely as a tool for technical advancement but as a pursuit deeply intertwined with ethical and philosophical questions. He reminds us that science must serve the public good, emphasizing the importance of intellectual curiosity and interdisciplinary collaboration over the narrow pursuit of profit or prestige via one's global ranking. Weaver builds on Planck's vision, advocating for a science that is more democratic and inclusive. Such a vision aligns with Derrida's call for a democracy to come, one that embraces what has been, and continues to be excluded or marginalized at the recesses of institutional shadows or the knowledges systems that continue to occupy the spotlight. For Planck then, the pursuit of scientific knowledge was an ethical endeavor, rooted in a commitment to the common good. Similarly, Weaver calls for a science as philosophy, as literature, as a version of humanities, guided by principles of justice and equity, addressing the ongoing injustices perpetrated in the progressive historical wakes of its name.

Planck's acknowledgment of the sociological and cultural factors that shape scientific inquiry is particularly relevant today. As Weaver notes, power dynamics within the scientific community often determine which questions are asked and which lines of inquiry are pursued. These dynamics can marginalize alternative perspectives and reinforce existing hierarchies. To counter this, Weaver also calls for a more inclusive approach to science and its education, one that invites diverse voices into the process of defining research agendas and evaluating success. This erosion is evident in fields like precision medicine and AI, where technological advancements promise unprecedented benefits while simultaneously reinforcing racial biases, data surveillance, and algorithmic discrimination (Chun, 2021; Phillips & Ng-A-Fook, 2024; Williamson & Eynon, 2020). Weaver warns of a future where science, unmoored from ethical reflection, becomes an instrument of control rather than liberation. *Slow science*, by contrast,

calls for a commitment to *care*—a reorientation of scientific inquiry toward the needs of the broader community rather than the interests of capital. Isabelle Stengers' concept of *cosmopolitics* further underscores this point, advocating for a science that is not isolated from the world, or its worldliness, but rather actively engages with diverse perspectives, including those communities who have been historically excluded from discursive regimes of *science*. At a time when scientific expertise is under attack—from climate denialism to vaccine conspiracies—the stakes of this discussion could not be higher as Weaver stresses in his introduction. A "truly" democratic "version" of science is not one that merely produces knowledges but remains open to public engagement, ethical scrutiny, and the lived realities of those affected by its humanistic promises of "progress."

This inclusivity extends to the relationship between humans and nonhuman beings, a relationship Weaver takes up through the work of Vinciane Despret. Weaver's integration of her ideas into his critique of science highlights the need for a more holistic and compassionate approach toward enriching scientific knowledge production as literature informed by alternative versions. Vinciane Despret extension of *slow science* challenges the rigid boundaries of scientific inquiry by advocating for openness to alternative ways of knowing, including insights from anecdotes and amateur knowledge ecologies of practices. She suggests that science is shaped by the models, methods, and epistemologies that determine which questions are considered legitimate, often excluding perspectives that could expand our understandings otherwise. Her work emphasizes *slow science* as a practice of hesitation and self-reflection that resists the rush to certainty and affords opportunities for more democratic, pluralistic lines of curriculum inquiry. As Weaver makes clear, Despret distinguishes between *visions*, which impose singular truths, and *versions*, which keep knowledge open to debate and revision. Perhaps, what we might consider to be a version of Serres' third curriculum. Moreover, she critiques methodocentrism—the dominance of fixed research methods that constrain thought—and calls for, like Weaver and the others included in this book, self-reflexivity in science, urging researchers to recognize their biases and assumptions. By embracing *vacillating* writing and thinking across disciplinary boundaries, she and Weaver invite scientists, educational researchers, and curriculum scholars to see, listen, and live in relation to one another, and the more-than-human world otherwise.

Returning to Derrida's concept of *promise*, without *promise*, Weaver envisions a future where these ecologies of practices are not merely preserved but transformed. Such transformation requires faith—not in the sense of blind optimism, but in the belief that change is possible even in the face of the current overwhelming odds. It also requires honesty, a willingness to confront the contradictions and failures of our universities. As Weaver notes, the pursuit of a democracy to come, like the pursuit of scientific

knowledge, is a process that demands continual reflection, critiques, and renewal. *Science, Democracy, and the University* is a profound and timely contribution to provoking other versions of understanding the challenges and possibilities of our era. To this end, Weaver's work is not merely an academic exercise in philosophical thinking, of curriculum theorizing, but a call to action, urging us to engage with the complexities of our time with courage, conviction, imagination, and a renewed commitment to serving the public good as part of our vocation. By drawing on thinkers such as, but not limited to, Jacques Derrida, Michel Serres, Bernard Stiegler, Isabella Stengers, and Vinciane Despret Weaver invites readers to reconsider science as a third curriculum, as an enriched literature, and in turn, offers a version of science, democracy, and the university that is at once critical and a little more hopeful. This book is a testament to the enduring importance of intellectual inquiry and the promise of a more just and equitable world. May it inspire readers to embrace the challenges of our time with the same rigor and compassion that John Weaver brings to his intellectual work and ongoing commitment toward serving the public good as part of our intellectual vocations as curriculum scholars, fellow planetary citizens, and human beings.

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INTRODUCTION

ABSTRACT

In the introduction the Derridean idea of a democracy to come is explained. Derrida's notion of the threat of the autoimmune to a democracy is also explained. Traditional ideas of science and their disconnect from democracies are challenged. The idea of a more democratic science and a more cosmopolitan science are introduced and connected to the philosophical tracts of Max Planck. Finally, Max Weber's famous essays "science as vocation" is introduced to demonstrate that the current USA university system is in crisis and a scholarly life has to be reclaimed. This chapter ends with the introduction of the rest of the chapters.

Keywords: Democracy to come; Derrida; autoimmune democracy; democratic science; Max Planck and cosmopolitan science; Max Weber and the university

SCIENCE, DEMOCRACY, AND THE UNIVERSITY

This is my second volume on the topic of science and democracy. In my first volume I tried to offer reasons why curriculum studies scholars should be interested in science matters. In this volume I want to focus on the university. I hope to start soon a third volume in which I will focus on science, democracy, and literature. In the first volume introduction written in 2017 and published in 2018 I was too quick in thinking through what living in a democracy might mean. I cited two reasons for my quick discussion of what a democracy might mean. First, I did not want to play an academic game, a gotcha game where I state a case or try to define what I mean by a democracy and academics wish not to engage in a dialog on science and democracy but instead look for limits and omissions

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in my argument and probe for gaps in my thinking. There is a fine line between probing to find faults and engaging in attempts to make a line of thinking stronger. I still do not wish to play these games and hopefully in the two chapters in this volume on Michel Serres readers will see why I do not want to play academic games. Second, it was early in the Trump administration when I wrote the introduction, and I did not imagine how dangerous Trump would be to the vitality of a living democracy and how a substantial majority of Republican party members wish to not live in a democracy in which all people are treated equally. Ironically, in my first volume I tried to demonstrate how science and democracy were not naturally wedded partners that philosophers like Kuhn and Polayni thought was a given, but I made the same assumption about democracy and the United States. I assumed democracy would never be threatened or questioned in the United States yet now I realize that 2024 might very well mark the end of any democracy to come in the United States. Of course, I never thought that the United States embodied the democratic ideals so many of its leaders have proclaimed over the last two centuries, but I firmly believed that the foundations for a vibrant democracy based in real equality and justice was laid or at the very least the seeds were planted. Now, I see the foundation is not built in cement, but quicksand and the seeds are planted in semiarid land that borders on a dessert and may very well be just a mirage. This is how dangerous Trump's term in office and his 2021 coup attempt were. While his first term undermined any faith is the justice system people might have had. In his second term he will destroy the justice system even more and will also destroy the military as a neutral entity in governing and social affairs. In this introduction, I want to spend more time discussing what a Derridian democracy to come might be and in particular I want to focus on his idea of autoimmunity and its pharmakon roots. I will then discuss again the importance of science in creating a democracy to come. I will do so by focusing on the work of Max Planck and Donna Haraway. Then I will end this introduction with a look at the idea of the university using Max Weber's classic essay "science as vocation."

A DEMOCRACY TO COME (THAT WE DESPERATELY NEED!)

Part of my hesitation to name in detail what a democracy to come might look like in my first volume was because it did not make sense to me to make an argument for nurturing a living democracy and then dictate what that democracy might look like and what principles should be valued. I will be less hesitant in this introduction to make such a case because

dictatorial forces in the United States are forcing my hand. I am in good company though in my initial hesitation. Derrida is also hesitant in his proclamations. In *Rogue: Two essays on reason* Derrida (2005, pp. 8–9) notes that this

> strange syntagma that does not form a sentence, comprising just three words—"democracy to come"— might seem to suggest I had wished to privilege indetermination and ambiguity. As if I had given in to the apophatic virtue of a certain negative theology that does not reveal its name, instead of beginning with a rigorous definition of what 'democracy' is properly speaking…what a democracy worthy of its name might presently be or what it might mean properly speaking….a meaning perhaps not null and void but not yet arrived, not yet bygone, of the word democracy: a meaning in waiting, still empty or vacant…'In the end, if we try to return to the origin, we do not yet know what *democracy* will have meant nor what democracy is. For democracy does not present itself; it has not yet presented itself, but that will come.

A democracy to come is not indeterminant or ambiguous. We know in the history of the United States and in the present circumstances certain peoples were never treated as equals in a democracy. There is nothing, in spite of deliberate obfuscations like All Lives Matter, and the labeling of Black Lives Matters as a terrorist organization, ambiguous about this history, and like Derrida, I do not wish my hesitation to name a democracy to come as grounds for some dishonest individual or organization to come along and exploit my hesitation. In the end as Derrida notes we need a certain amount of faith, but we also need a certain amount of honesty which is so rare to come by in the United States. We have to have faith that if we stay on the course a democracy to come where equality and justice reigns supreme will continue to come, and democracy will continue to grow and flourish in ways we never could imagine today. But this faith has to be met with honesty; an honesty in which the United States seriously looks into its white supremacy roots, its continual manifestations up to and including our current moment, and denounce it unequivocally. No excuses, no claims of white victimhood, no proclamations of "why are you making me feel guilty?," no attempts to erase the present or past. Just a clear break from white supremacy for the first time in the United States's history. With this honest reckoning, not a confessional, a confessional is not enough, and a faith in what might come and a democracy might just come, one worthy of its name and the adoration of all. But note part of Derrida's hesitation and mine is the tendency to turn this adoration into a formula, a method, a protocol, a declaration that, like all proclamations, states dangerously and falsely "now see we are there, we have reached the promise land can we please now be left alone?" Formulas, methods, protocols, and declarations all hide within them a danger that threatens to not promote a democracy

to come but to shut it down. This is what causes problems for science too. When formulas, methods, or protocols become the reason to do science and become the rationale to legitimize science, then it is not science. It is a formula that promotes nonthinking. There is no science to come when it becomes formulaic only stagnation and mediocrity. Just as there is no democracy to come when there is only a declaration or a pledge that allows segments of populations to ignore the plight of those other groups who do not share in the abundance of wealth that a democracy to come promises. A democracy to come, like a science to come, requires constant thinking and very little rest. This may frustrate those who have been educated to think that because they are a certain race, gender, sexual orientation, ethnicity, and religion that democracy was "ordained" for them and now other people who are different from them want the same thing. For those who think they are "ordained" the desires of the "others" to partake in democracy is a clear sign of decline and corruption. This is an educational problem for the "ordained" not a democracy problem for the excluded. The latter groups are morally, politically, and socially correct. The former are privileged and unwilling to constantly think through the limits of their beliefs and open their minds to other possibilities. The "ordained" lack faith and honesty.

If only life in a democracy were this simple. I do not expect those who embody white privilege to surrender and miraculously open their minds to a democracy to come. I do not have faith in them. I do have faith in a democracy to come and this implies I must be always open to the pharmacological problem of democracy as an autoimmune system. "Democracy has always been," Derrida (2005, p. 31) reminds us, "suicidal, and if there is a to-come for it, it is only on the condition of thinking life otherwise, life and the force of life." Democracy is always on the brink of attacking and destroying itself. Derrida (2005, p. 34) asked before the rise of Trump and the MAGA cult movement: "must a democracy leave free and in a position to exercise power those who risk mounting an assault on democratic freedom and putting an end to democratic freedom in the name of democracy and of the majority that they might actually be able to rally around to their cause?" Prior to the rise of Trump I would have responded to Derrida's question drawing our attention to the autoimmune destructiveness of democracy with a firm yes. Yes we must risk everything in the name of democracy even democracy itself. Now after a very real coup in 2021 and his re-election I hesitate and say "yes but." I hesitate because the destructiveness of our autoimmune system has shaken our democratic foundation. We need to risk everything in the name of a democracy to come but we must resist to our last breath that which wishes to shut down any attempt to create a democracy to come. If we do not resist antidemocratic forces then suicide may very well be our destiny as a people and world.

There are two ways I want to highlight a resistance to the suicidal tendency of an autoimmune system. First, is Derrida's concept of the voyou. The suicidal tendency of the autoimmune is an "excluding [of] all the others, in particular bad citizens, roques, noncitizens, and all sorts of unlike or unrecognizable others," (Derrida, 2005, p. 63). The voyou is the rogue or the others who do not fit in and the others who citizens wish to exclude. The counter for Derrida to this temptation to exclude is an open act of hospitality. An act to invite the rogues into the community. This form of hospitality for Derrida (2005, p. 72) is "the right to self-critique—another form of autoimmunity." To counter the suicidal tendency of democracy to close itself off from other possibilities, other forms of equality and justice is to commit to a form of self-critique, an act of faith that tries to not exclude but to open itself up to "bad citizens, roques, and noncitizens." It is in these people that democracy to come can be nurtured and it is in these very people that the suicidal half of democracy's autoimmune pharmakon can be kept at bay long enough to create a more vibrant democracy to come.

A second way to cultivate a resistance to the suicidal tendency of autoimmunity regards science. In volume one I made the case that too many scientists are more than willing to sacrifice democratic freedoms and work for authoritarian institutions that over time have included monarchical governments, Nazi Germany, Stalinist USSR, Communist/Capitalist China, and Oligarchical, multinational, corporate capitalism. How do we counter this tendency in order to create an autoimmunity of self-critique? In regards to science the suicidal autoimmune tendency in the United States takes the form of an anti-science that is a dangerous conspiratorial paranoia. This paranoia reached different heights it seemed during the pandemic. Once the United States braced itself for the reality of a coming pandemic it did not take long for conspiracies to float throughout the internet and society of how the use of masks were not effective, the vaccinations were deadly, and Dr. Fauci was a murderous criminal. These conspiracies were nurtured by shrewd politicians who demonstrated zero leadership abilities in challenging delusions of the paranoid. Instead they made them worse by legitimizing the conspiracies. The suicide pact of the anti-science movement is nurtured also by internet personalities that doubt science at every turn and seek out any alternative to scientifically proven modes of inquiry by latching onto anything that can be perceived as an alternative to science. This is not a form of healthy self-critique but in a suicidal pact that picks cliches (i.e. do your own research), undisciplined (minutes of reading on the internet and the rejection of scientific journals), and irrational thoughts (vaccinations murder people) over science. This anti-science movement only nurtures the paranoid side of democratic society and makes it harder to nurture self-critique in society. In this volume as I tried to do in volume one is suggest that in order to create a self-critique of science, scientist must find ways to

bring more people into the scientific process. Each chapter in this volume and each philosopher highlighted in each chapter makes this case in their own way and I try to highlight how Jacques Derrida, Michel Serres, Bernard Stiegler, Isabella Stengers, and Vinciane Despret suggest scientists can invite more people into the scientific process. In the name of a democracy to come and in avoidance of its suicidal autoimmune tendency, scientists need to entertain the ideas of these philosophers more seriously through self-critique, or the conspiratorial paranoid will win out.

SCIENCE

At first glance it might seem strange to use Max Planck's *Philosophy of Physics* to introduce the essays of this book regarding the importance of science matters in society. Planck was a traditional modernist who believed, not blindly, in the power of science to lead to, promote and enhance societal improvements, and the self-correction, self-critique, and the certainty of methods. Yet he was one of the first scientists to criticize Ernst Mach's positivism and what eventually became known as logical positivism or analytical philosophy. Planck believed there was more to scientific matters than clear, concise, and cold logic, and metaphysics no matter how disdained by the logical positivist was a necessity of life and science. I am not sure how Planck would have responded to the rise of science studies, but there is plenty in his short philosophical tract that suggests he at least would have been open to the benefits of studying science from a philosophical, historical, sociological, or anthropological perspective.

I make this claim because Planck was open to any avenue of inquiry within reason to lead to a fruitful vein of inquiry. In his chapter on "scientific ideas" Planck (1936, p. 48) notes that

> any scientific idea arising in the mind of a scholar is based on a concrete experience, a discovery, an observation, or a fact of any kind, where it is a physical or astronomical measurement, a chemical or a biological observation, a discovery among the archives or the excavation of some valuable relic of an early civilization. The content of the idea consists in this experience being compared and being brought into contact with certain different experiences in the mind of the the scholar.

To this point Planck's vision of what science can do is very traditional but he recognizes that science is a broader concept than the natural sciences and there is a relationship between the physical world and the intellectual world of the human mind. It is what he says after this qualifying declaration of the meaning of science and the importance of philosophy in the sciences that deserves our attention. "What is important, however," Planck (1936, p. 48)

suggests, "is that the task of applying the new idea in its entirety shall lead to new questions and hence to new studies and to new successes." The standard of science is not what is the utility of a certain line of questioning and a research agenda, but for Planck it is what intellectual fruit might a new line of thinking bear? Planck's commitment to intellectual endeavors for the sake of curiosity and imagination leads me to believe that he would recognize the importance of science studies simply because of the new lines of questioning and inquiry they have produced. The new questions, new studies, and new successes Planck mentions is more than enough reason to recognize the importance of science studies as we, hopefully, enter into a new era in which scientists and nonscientists collaborate to create a more democratic science. By a more democratic science I mean a science in which nonscientists are invited into the process of deciding what lines of questioning will be valued, which studies will be funded, and how success will be defined in science. This I want to firmly stress should not be based on principles of utility or economics, although these should be a factor considered but never a driving force. We should afford the curious and imaginative scientist as much time as possible to explain and prove to society why their lines of questioning should be sanctioned as legitimate science. The scientists should not be pressured to demonstrate immediate outcomes under the pretense that science must bear economic outcomes for it to be a legitimate form of intellectual inquiry. The needs of all segments of society should be duly represented in at least some scientific agendas and those needs should shape the way scientific questions are raised, studies defined, and successes named. This does not mean science should be manipulated to fit the needs and wishes of any segment of society. Involving all segments of society means science will finally address the intentional and historical use of science to erase, torture or delegitimize certain segments of society in order to enhance (settler) colonial, anti-Black, patriarchal, and white supremacist ideologies. It also means science will finally be used to address, in a non-manipulative manner, indigenous, ethnic, gendered, racial, nonreligious, and non-Christian, and economically disadvantaged concerns that shape the lives of these communities. The works of Serres, Stiegler, Stengers, and Despret all demonstrate how this can be done.

Planck's philosophical tract also demonstrates how science can be less domineering in its assumptions about other fields of knowledge. Planck recognizes that there is a hierarchy of knowledge that pervades the sciences, but this need not be the case. He wishes to construct an intellectual relationship between the disciplines that is more interdisciplinary and less hierarchical. "There is especially among mathematicians, physicists, and chemists," Planck (1936, p. 60) acknowledges,

> a tendency to employ their own exact methods in order to throw light on biological, psychological, and sociological questions….In other words, it does not suffice for an ingenious student to be thoroughly acquainted with his original subject; if his more widely ranging ideas are to be fruitful, he must also have some knowledge of the facts and problems of the other sphere to which he is applying his ideas.

Planck here is encouraging us to transgress disciplinary boundaries but to do so in a manner that recognizes the cultures that exist within other disciplinary fields. This is much more democratic manner to promote interdisciplinary work than to stake a hierarchical claim that assumes some forms of academic knowledge superior over others. This interdisciplinary interaction will require natural scientists to be less defensive of their intellectual boundaries, more inviting of nonscientists into their comfortably chaotic homes of research, and less judgmental of those who come with different credentials. It will also require nonnatural scientists to do their homework before they seek to earn their passport to enter into other academic fields of knowledge. This interdisciplinary work though should not just include academics, properly disciplined in an intellectual field. Academic boundaries should be opened up to amateurs and nonacademics who merely wish to learn and understand more about a field of knowledge. They too will have to do their homework, but they should be unconditionally greeted with open arms by all academic fields of knowledge. This is a point that Despret will especially make in regards to the role of amateurs in science discourses and research.

There is another reason I wish to focus on Planck's philosophical tract in this introduction. It seems that Planck was keenly aware of how sociological and cultural factors shape scientific agendas within scholarly communities. He recognizes that there are power plays at work in fields of knowledge. "I myself," Planck (1936, p. 52) acknowledges,

> experienced during the [18]80s and 90s of the last century what the feelings of a student are who is convinced that he is in possession of an idea which is in fact superior, and who discovers that all the excellent arguments advanced by him are discouraged simply because his voice is not powerful enough to draw the attention of the scientific world.

Power and prestige do matter in science and those with established reputations are listened to more over the voices of the less established. This sociologists, historians, philosophers, and anthropologists know, but it seems that Planck also knew this but perhaps his colleagues were not interested in understanding how such power plays shape scientific agendas and lines of questioning. Planck seems to be one of the few scientists who was interested in how science matters are shaped. In fact, I want to suggest Planck was