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A Plea for Pure Culture

*The Pure Science Ideal*

Americans, perhaps more so than people of other nations, have great faith in the idea of the outsider inventor. The stories of inventors who made it out of their garages (Steve Jobs) and those who stayed there (Philo T. Farnsworth) are part of the national mythology. Ever since Benjamin Franklin broke with his apprenticeship in Boston as a teenager and recreated himself as a freethinker and fearless inventor (a narrative, some say, he simply repeated and wrote large with the founding of the nation), amateurism has taken on different connotations in this country. Old World use of the word “amateur” intimated lower-class status, even incompetency, but in America, the land of second acts, “amateur” has accrued some of the more positive meanings we associate with the concept of the autodidact. Americans seem drawn to the story of the outsider-made-good with an intensity that has riveted the nation from the earliest amateur contests featured regularly in Vaudeville to the latest versions of such shows. . . . In America, the self-made citizen is a kind of superhero.


While industrial invention was booming in the United States during the decades leading up to the 1925 publication of *The Great Gatsby*—spurred on by the democratic approach of U.S. patent law—it should be clear at this point how this very circumstance contributed to an immense cultural anxiety. This anxiety, felt by what Fitzgerald called “the old American aristocracy,”† and all variant of intellectual figures, was more complex than mere worries about the fact that inventors of humble origins could become wildly wealthy. More than this, inventors and their inventions were being associated with the disruption and corruption of every aspect of “culture” as by definition, in Matthew Arnold’s words of 1869, a “disinterested endeavor.”‡ Invention, along with the parallel philosophy of pragmatism, was thus a large imaginary sign of the changing status of ideas, of the idea that knowledge was becoming experimental. To the extent that literary texts dealt with this
emerging problem, by actually including invention in narrative schemes and plotlines, the stories told are always traceable to a larger discussion about the struggle over democratic notions of social status and economic mobility that were beginning to become more pervasive, more realistic, than ever before, precisely because invention was having a real impact. Conversations about purity and disinterest, purpose and utility, aesthetics and art, ideas and action, are at the heart of this struggle. To paint a more coherent picture of this “dense and tense knot of social, and essentially class, relations, themselves in complicated transition,” I turn now to the heated conversations taking place outside of literature over the integrity of the independent inventor during his “golden period”: this figure was publicly debated by cultivated Americans to the extent that he forwarded the interests of practicality and not the pure project of disinterested science, even while he retained a heroic status in the popular imagination.3

In 1896, the year F. Scott Fitzgerald was born, a writer in Scientific American remarked on the “outpouring of U.S. patents since the Civil War,” zealously declaring that his was “an epoch of invention and progress unique in the history of the world. . . . It has been a gigantic tidal wave of human ingenuity and resource, so stupendous in its magnitude, so complex in its diversity, so profound in its thought, so fruitful in its wealth, so beneficent in its results, that the mind is strained and embarrassed in its effort to expand to a full appreciation of it.” Such an enthusiastic estimation of America’s technological advances reveals no sign of the immense controversy that had erupted in the field of scientific research over the question of what constituted “science” and, particularly, whether invention should be counted as such. Within Scientific American, a publication named to link national identity and scientific advance, the conflict between science and invention was thus minimized, which suggests that this publication was sympathetic to the cause of invention, or technology, for if it associated itself with the cause of “science,” it would most likely renounce invention: rather than celebrate America’s technological advances, it would promote a resentment toward those largely responsible for such a “tidal wave of human ingenuity”—the inventors themselves.

At the turn of the century, scientists who claimed a superior status for themselves and their work were stridently asserting the difference between science and invention. With the support of various influential figures from a range of fields, including America’s literary elite, this distinction turned into a sweeping critique of invention, which was blamed for (among other things) the degradation of science. Ultimately, as invention became systematized, which meant the extensive production and
marketing of inventions themselves, its high profile brought extra attention from its critics, “who insisted that invention had become an arm of industry, and could no longer be heralded as a sign of an independent spirit, for the inventors were no longer independent” but merely the agents of large corporate interests, or, just as bad, driven by their own personal profit motives. The effort to cast inventors and invention in this kind of negative light occurred alongside the effort to recuperate the inventor in his original romanticized form, or as he once was: an American “prototype of autonomy and experimentalism, an industrious creator motivated by his own quest to solve practical problems, and in the process, bring about results that could benefit every American.” Think, for example, of the mythical status of Benjamin Franklin. Yet while the myth of the independent inventor “sits at the heart of the American ideals of functionalism and entrepreneurial possibility,” the realities brought on by the accomplishments of these inventors always already threatened and collided with the aesthetic aspirations and social security of elite society.

In *American Genesis: A Century of Invention and Technological Enthusiasm 1870–1970*, Thomas Hughes points out that “a singular band of independent inventors was flourishing during the decades extending from about 1870 to 1920” (14). What can then be called the era of the independent inventors—“those individuals who were not bound by organizational entanglements” and therefore were “free to choose their own problems”—began “about the time Alexander Graham Bell invented his telephone and Edison opened his Menlo Park laboratory in 1876, and ended shortly after World War I, when industrial scientists, employed by universities, the government, and private enterprises, took the place of the independents as the principal locus of ‘research and development activity,’ the new name for invention” (Hughes 15). It was thus the independent inventors’ freedom from large-scale business concerns that defined their activity as independent, which points toward the relatively abstract nature of such inventing, in the sense that it could pursue all kinds of experiments and explorations, regardless of their commercial viability. In other words, although the independent inventors did spend a fair amount of time trying to make things that would be commercially successful, they also engaged in less commercial pursuits.

To be sure, independent inventing—while certainly a practical endeavor in that many of the actual inventions served practical purposes—was often carried out in an abstract sense, and so was in many ways an extremely impractical activity, which complicates the labeling of independent inventors in the late nineteenth century as merely “practical men.” Yet the fact that independent inventors were not, in the
first place, always motivated by profit did nothing to assuage the affluent critics of invention, whether educators, scientists, or intellectuals, who insisted that inventors and their products were responsible for the increasing devaluation of discovery purely for the sake of knowledge. To make their case, these critics emphasized the displacement of independent inventors, highlighting the convergence of these individuals with large corporations, which often had a specific result in mind. To a large extent this displacement did indeed occur, although it cannot entirely account for the attack on invention, which had complex motivations.\footnote{11}

Ultimately, an unaccommodating atmosphere demanded that independents be entrepreneurs as well as inventors, so it would be inaccurate to suggest that they had nothing to do with capitalist enterprise.\footnote{12} On the contrary, although they were most excited by the practice of inventing, “they performed the entrepreneurial function of establishing companies because they wanted to bring their inventions into use” (Hughes 24). This often meant they were partners with capitalists, although, importantly, not working for them; most independents, when they “found their particular innovative talents no longer needed . . . withdrew—or were forced out—from the companies they founded” (Hughes 22), which suggests that, for all their practical intelligence, the independents were not excessively committed to the full scope of practical considerations they were faced with in such a field: their participation in the business side of things went only so far. Characteristically, “they withdrew to spaces of their own choice or design,” surrounding themselves with a few loyal craftsmen, and the proper tools and apparatus necessary to fulfill their creative drive (Hughes 25).\footnote{13} On an obvious level, such a withdrawal reveals a need to escape the restrictions of a particular context, or more generally, context itself, and, as Hughes notes, it certainly parallels that of the avant-garde artists who resorted to alternative lifestyles and spaces in order to isolate themselves from the confining influences of mainstream ideology. If retreating to an isolated space is instrumental to any project challenging the status quo, the ecology of such examples suggests how isolation, at least from the hostility of convention, has always been imagined as a component of creativity in some form. Thus, the implication that turn-of-the-century artists and inventors were both creative beings in the most abstract sense, which is to say the least practical, is not far-fetched. Claire Pettit makes this point regarding inventors and artists in the mid-nineteenth century in her book Patent Inventions: Intellectual Property and the Victorian Novel (2004), noting that “the mental labour of mechanical inventors such as John Swan, and of literary writers such as Charles
Dickens, was constructed and discussed in very similar terms” and that, indeed, there was not thought to be a “sharp divide between the categories of literary and mechanical invention.” The sharp divide, on the contrary, was between these individuals and the conventional world. In some of her most influential criticism, Willa Cather aligns her theory with this observation, arguing that the “world” must all but disappear for the artist: “An artist should not be vexed by human hobbies or human follies; he should be able to lift himself into the clear firmament of creation where the world is not. He should be among men but not of them, in the world, but not of the world.”

For the famous inventor Nikola Tesla (1857–1943), isolation, or a largely context-free existence, was the “secret of invention.” “It is providential,” said Tesla, “that the youth or man of inventive mind is not ‘blessed’ with a million dollars. The mind is sharper and keener in uninterrupted solitude. Originality thrives in seclusion free of outside influences beating upon us to cripple the creative mind. Be alone—that is the secret of invention: be alone, that is when ideas are born.” While this statement connects seclusion and invention, just as compelling is Tesla’s suggestion that money is interruptive—it interrupts privacy and solitude and in turn the purity of atmosphere that lends itself to “free” or inventive thinking. In fact, Tesla might as well have said “pure” solitude instead of “uninterrupted” solitude to make his point—while the term “interrupt” customarily means “to break the uniformity of,” the term “pure” connotes a uniformity of composition, a freedom, essentially, from “outside” influences or elements. Similarly, Cather later wrote in her 1936 essay “Escapism” that “The condition every art requires is, not so much freedom from restriction, as freedom from adulteration and from the intrusion of foreign matter; considerations and purposes which have nothing to do with spontaneous invention.”

Tesla’s remarks reveal a distinct desire to separate invention from money (Cather engages in the same gesture in her treatise on “art”), and this desire has everything to do with the hostile response on the part of “civilized” or “cultivated” society toward invention, a hostility that sparked an aggressive campaign at the turn into the twentieth century to discredit and denounce invention on the grounds that it was a practical (read: philistine) pursuit and therefore unworthy of “cultural” status. While it is true that by the end of the nineteenth century science was finally becoming an acceptable part of (the idea of) “culture,” which is to say it finally earned a respectable position in the curriculum of higher learning and became a sign of cultivation, its burgeoning status was
reserved for unapplied scientific research. As Adrian Johns has recently put it, the imagined “ideal” of pure science was “an objective, ideologically neutral endeavor, yielding knowledge independent of the place of its creation”—science for its own sake, essentially.\(^\text{18}\) Theoretical studies in science had the approval of the cultural elite in the United States; scientific research for practical ends, on the other hand, did not, for this kind of research was considered crude: it had as its goal the use of knowledge for profit. Moreover, in the United States, many successful inventors only reinforced the already too popular European view of “America” as a practical nation with no (commitment to) culture—a nation of philistines, or “practical men” who rarely contributed to higher learning but instead were devoted to material wealth and commercial success.\(^\text{19}\)

Thus, cultivated communities in the United States made it a part of their agenda to not only establish and maintain a culturally rich (i.e., simply cultural) self-image but also prove to any transatlantic critics that the United States could indeed guide the world in a “civilized” or cultural pursuit. As a relatively new territory, science provided the perfect opportunity to accomplish this kind of image alteration: it had been admitted to the canon of culture, and would only continue to gain authority. The only thing the social elite had to do was make sure that the “higher” pursuits—the abstract, idealist, conceptual pursuits—remained at the forefront of scientific inquiry, or at least received as much attention as the technological accomplishments. If science in the United States could maintain its distance from invention, in other words, the United States could lead “the science of the world,” and put itself on the map as a cultural, and not just practical, power.\(^\text{20}\) Assuming the presidency of Harvard in 1869, Charles Eliot summed up this posture toward the advance of science when he declared that science “ennobles and purifies the mind.”\(^\text{21}\) It was, therefore, as pure and noble as any classical discipline, and according to its new status at Harvard, it could—and did—constitute “culture.” In fact, in Eliot’s view, science was the nineteenth century’s “great addition . . . to the idea of culture.”\(^\text{22}\) It is worth noting how Eliot equates culture with ideas, or his definition of culture as an idea. This is precisely the point here: culture, defined as or in the realm of ideas, needed to remain an abstract, removed, dislocated concept—a form of theory, essentially—so in order to be culture, science needed to remain a conceptual and not an applicable discipline. Because, as Eliot remarks, science was being accepted as a great addition to the “idea of culture,” its only potential problem was the intimacy it was developing with industrialism, and, quite expectably, Eliot and other patricians were casting this relationship as a threat to the purity of science, which is to say the purity of culture.\(^\text{23}\)
Even if, as President Ezekiel G. Robinson of Brown University observed, by 1914 science had “got a foothold in the curriculum which it is never likely to lose,” the years leading up to this status were quite troubled, for as science became a major player in the marketplace, there emerged both within and outside the scientific community a heightened sensitivity to its developing reputation as a context-oriented discipline, or a discipline with strong ties to the world of business, which of course means strong ties to economics and politics; a discipline, moreover, with a specific eye on application, and, following this, one that exhibited a growing commitment to the most contextual of things: specialization.

The controversy over specialization, occurring mostly in the sphere of higher education and academic debate, had to do with the threat to what might be called generalism, by which is meant the educational philosophy that privileges broad knowledge, humanistic principles, and “proper” conduct. Generalism, in other words, actively opposed specialization as a mode of thinking and learning primarily because, its proponents claimed, such a mode subordinated the values of classic humanism. For example, as an advocate of generalism, President James McCosh of Princeton University expressed his dissent from any dominant application of the elective system in 1871 when he said, “The objection is, that it would nurture specialists without a general or comprehensive culture.” It was then the supporters of “liberal culture” in the field of higher education who represented the academic sector of the genteel tradition by rejecting a curriculum devoted entirely to specialized learning.

The relationship of this generalist/specialist controversy to the history of science and invention, then, is that for the most part the debate was inspired by and concerned with science: it was science that was fast becoming highly specialized (and highly prized) and thus threatening to affect the whole of education and, in turn, culture itself, by promoting an end-oriented or result-oriented learning program. Whereas a generalist approach to education reflected the idea that culture existed only for its own sake—transmitting “culture” (as an end in itself) was the primary goal of a general, liberal arts education—a specialist approach, following the trend of scientific study, reflected an increasingly practical outlook that designated a purpose for everything. Science, in short, was too vulnerable to material applications to be a safe bet for an educational program that sought to maintain the internal, consummate value of ideas.

To the extent that science advanced its status, academically and publicly, it could thus discourage “a proper balance of character,” for its tendency toward perpetual division (into various specialties) and result-oriented research would advance a practical mindset, which would not
only degrade the value of a disinterested approach to learning (and knowledge in general) but also displace this tradition. In effect, this meant the displacement of culture. Thus, even the educators who advocated the importance of science in the curriculum of higher education took pains to reassure elite U.S. society (and each other) that although they were allowing science to occupy a privileged place in the college curriculum, this was only under the condition that science remain loyal to the ideal of culture: it must remain an abstract pursuit, a body of knowledge and conduct that had no political, social, or economic interests. As the president of MIT declared, “Our aim should be: the mind of the student, not scientific discovery, not professional accomplishment.”

Privileging the dislocated “mind of the student,” educators and intellectuals feared that the “mind,” or the ideal of “mind” as complete in itself, was becoming vulnerable to a more social, more contextual, more active ideal: the “mind of the student” was in danger of being corrupted by what was becoming the dominant ideology of scientific study (experiment in order to find answers) and professional advancement (apply those answers in order to achieve wealth and status). Evident in the discourse of these prominent public figures was the influence of that legendary definer and protector of Culture, Matthew Arnold, who wrote in 1869 in *Culture and Anarchy*, “Culture, then, is a study of perfection, and perfection which insists on becoming something rather than in having something, in an inward condition of the mind and spirit, not in an outward set of circumstances.” In line with Arnold’s dictum, higher education in the United States purported to turn away from the “outward” and from the goal of “having something.” “We must beware,” Johns Hopkins president Daniel Coit Gilman warned in 1879, “lest we make our schools technical instead of liberal, and impart a knowledge of methods rather than principles.”

“Beleaguered but steadfast,” Joan Shelley Rubin writes, proponents of generalism (or Arnoldian “culture”) “continued to defend their policy that the classroom was to be a refuge from narrow vocational concerns and a retreat from mediocrity and materialism.” This defensive stance—taken against materialism, mediocrity, and narrowness—is indicative of a severe cultural anxiety on the part of elite communities about the idea of culture itself, and how, or whether, to reconcile this idea with the principles of democracy. The alternative to such a reconciliation, very desirable to the advocates of culture, was to find a way of maintaining the legitimacy of high culture—the classic definition of culture—as an essentially undemocratic, yet nonetheless acceptable and necessary, phenomenon that must be preserved at all costs (and ultimately something with a utility of its
own. While it is clear that the ideal version of culture was colored by democratic desire (according to Arnold, for example, culture would ideally do away with classes), the reality was less flexible and class-laden: culture was the domain of a privileged, educated minority, and serious efforts to reform this circumstance were met with serious resistance.

Returning to Tesla’s remarks, he is responding to the pervasive critique being made of invention by suggesting that invention is indeed consistent with the generalist value of abstraction, which is the same thing as being consistent with individualism, in the sense that individualism is about a dislocation from the outward social (political, economic) realm. Following this idea, Tesla’s remarks imply, inventors are not to be automatically aligned with practical, commercial sensibilities or agendas; they are, on the contrary, engaged in an activity of the “mind” (which he says twice), a pursuit of “ideas.” Tesla reiterates that inventors thrive on the dislocation of solitude; he even advises inventors to “be alone.”

Here it is worth pointing out that Tesla’s depiction of such dislocation is also a critique of the “linear” model of innovation that pervaded (and in many respects still pervades) the science world. This model upholds the pure science researcher as the individual source for ideas, the source for inquiry and discovery that leads next to the practical, industrial stage; not only does such a model discount the collective community, and the intellectual exchange between technical and theoretical research that always already compromises the ideal of “pure science,” but it serves by extension to gesture toward the ideal of a singular individual as responsible for any particular innovation. In his article “The Linear Model of Innovation Science” (2006), Benoît Godin shows that “linearity was a fiction,” and that it was “political rhetoric.” Yet the power of this rhetoric was responsible for the commonly held belief that inventors merely applied the original ideas of pure scientists. Thus Tesla intentionally ignores the question of application, for as a renowned inventor, he encountered critics such as physicist Henry Rowland, who was an outspoken advocate of scientific research purely for the sake of “truth”—an advocate of “pure science.” Considerably more radical than Charles Eliot, Rowland insisted that nothing done for the sake of application could claim the status of “science” and, moreover, that those who engaged in “practical” research were encouraging the degradation of science to “low, money-making levels.”

As Rowland was a popular figure in his day, his views and initiatives were far-reaching, influencing a range of intellectual communities, including the literary one. In later years, for example, Willa Cather refers to Rowland in her novel The Professor’s House (1925), drawing him into the story. The novel’s fictional hero, Tom Outland, considers an option to
study at Johns Hopkins University “in the laboratory made famous by Dr. Rowland.” This reference to Rowland accomplishes at least two things. First, it signals the familiarity that literary intellectuals such as Cather had with scientific culture and developments, and second, it suggests the support that elite, educated individuals gave to the cause of pure science, for Cather is undoubtedly sympathetic to Rowland’s cause, and goes out of her way to champion any initiative to disentangle culture and commerce, or aesthetics and action: as a student of physics, Cather’s young hero Tom Outland does indeed discover something that leads to a major invention; yet, though he “knew his idea would make money,” Tom is not interested, and he leaves it “to take care of itself” (striking a complicated pose with regard to the discourse of carelessness found in *The Great Gatsby*). Cather’s narrative explains that in dying young, without ever having applied his findings, Tom preserves the integrity of his idea, and thus of ideas in general. He “escaped all that,” Cather writes; he “made something new in the world—and the rewards, the meaningless conventional gestures, he had left to others.” He escapes the degradation, or as Rowland put it, “the low, money-making levels” that are reached only when an idea is translated into some form of action, which inevitably links it to the economy and the political sphere. While the explicit connection Cather makes between her fictional hero and the real Dr. Rowland signifies her support of research for its own sake, in any field, perhaps the more important point is that Cather’s narrative condemns the commercial interests that dominate scientific discovery, not scientific discovery itself.

This approach is consistent with pure-science advocacy. In the view of turn-of-the-century pure-science activists, there needed to be a distinct line drawn between business and science, and invention was to be thought of as business—as contaminated with business interests. For example, to illustrate the dislocation, which is to say the disinterest, claimed by pure science, its advocates liked to tell the story of the scientist and the practical- or business-man. Urged to apply his talents outside of research, the scientist would retort: “My dear sir, I have no time to waste in making money.” The point of such a maxim is, clearly, to claim a higher—or highbrow—status for pure science. While it is arguable that such a claim is traceable to a particular agenda, the purpose for pure-science advocates was rather to deny this, and instead to cultivate political neutrality. Pure-science advocates therefore popularized a discourse that not only demanded *science* be disinterested but claimed, as well, that there were no political interests in its own advocacy of such dislocation. Yet the care-free, or careless, attitude expressed by those who had “no time to waste in making money” was also the attitude of those who *had* time (to engage in
science as a noncommercial program) precisely because they had money.

In 1887 a Cornell scientist observed this dynamic, noting the role of money in the world of scientific research: “In this country, men devoted to science purely for the sake of science are and must be few in number. Few can devote their lives to work that promises no return except the satisfaction of adding to the sum of knowledge. Very few have both the means and inclination to do this.”40 The ability to devote oneself to science without any promise of economic return was thus dependent on one thing: whether the researcher occupied a particular class position. As Daniel Kevles notes, turn-of-the-century American scientists “tended to come from the narrow fragment of society that called itself cultivated; most were the sons—or married the daughters—of well-to-do merchants, gentry, lawyers, ministers or teachers; almost all were white Anglo-Saxon Protestants.”41 To engage in pure science was thus a privilege traceable to a distinct economic advantage. The accusation made by pure-science advocates—that applied science had only commercial motivations and thus diminished the inherent value of knowledge—must be understood, then, in terms of an anxiety about the work of the working class: the fact is that invention had the potential to disrupt class hierarchy, while science—polite science—did not.

This is not merely to say, however, that the dispute between science and invention is a microcosm of the larger dispute over the fate of “culture” in a society that was becoming increasingly dominated by technology and business interests (and along with this, increasingly, publicly influenced by women and ethnoracial minorities), although this is the case; rather, the point is to argue that the dispute between science and invention was itself the central issue, and not merely a microcosm, because it was in fact invention that was changing the world to such a degree that it became impossible to maintain the structure on which the (genteel) idea of culture relied. James Russell Lowell, the influential intellectual, diplomat, Harvard professor, MLA president, and first editor of the Atlantic Monthly, called attention to this (as a) problem when he wrote, in the late 1880s, “It may well be questioned whether the invention of printing, while it democratized information, has not also leveled the ancient aristocracy of thought.”42 According to Lowell and many other supporters of the “ancient aristocracy of thought,” then, it was because invention forwarded the interests of democracy that it was breaking the “upper-class monopoly of culture.”43 Lowell was not complaining about science but about the effects of practical science or technology on the salubrity of cultural aristocracy. These effects would extend, moreover, to diminish the aristocratic ideal of “thought” or “the mind” as self-suf-
fficient and not wanting of application. Thus, it might be said, Lowell was not complaining about invention but about democracy.

The End of Culture

Lowell is among others lodging the same type of complaint. Physicist Henry Rowland expressed a very similar sentiment when he noted that the flaws of American science reflected the “pride” taken in “a democratic country . . . in reducing everything to a level.” American science could not advance, in other words, until a strict line was drawn between the “best,” and all the rest: anything with commercial interests was in the category of the rest, of course, and, as Rowland made abundantly clear, “the best” science could be possible only if there was a concentration of educational wealth in a small group of top-rated universities. If this kind of “best-science elitism” was to be looked down on or at all discouraged in favor of a more democratic system, Rowland insisted, then American science could not hope to rival or surpass Continental scientific achievement, nor could it claim a stake in the advancement of knowledge for the sake of “truth.” In Rowland’s view, something “must be done to create a science of physics in this country, rather than to call telegraphs, electric lights, and such conveniences by the name of science.” Pitting pure science, theory, abstract research, or the ideal of “thought” against the ideal of—or the practical demands of—democracy, figures such as Rowland and Lowell were in essence advocating the maintenance of a monopoly, or an “ancient aristocracy,” which is to say the maintenance of a cultural hierarchy, for they anticipated the impact of democratic principles to be synonymous with the end of culture.

To be sure, this feared end or termination of culture as it was being imagined was synonymous with the (re)making of culture into an end-oriented, result-driven, public domain. It should be noted that in the mid-nineteenth century, this was the purpose of the educated elite: to make “culture” popular and accessible to the masses, so that it was not lost in a sea of materialism and practicality. Consider Emerson’s 1867 essay, “The Progress of Culture,” in which he endorsed a “knighthood of virtue” comprising the “few superior and attractive men” who, as the “delegated intellect,” would be equipped to “calm and guide” the people. His purpose was to guarantee “the gradual domestication of Culture.” This plan backfired, or was at least abandoned by the cultural aristocracy, because this elite group came to realize that refining the masses meant an end to the most definitive and precious core of culture: its exclusivity.
Turning it into something that would be publicly accessible would only ruin it; it had to remain private and inaccessible—“where the world is not”—to remain itself.

If invention was helping to bring about this end, helping to dilute the purity and the exclusiveness of what should remain a private domain, this was because, as I have noted, its occupation was open to anyone with an interest. Edison himself drew attention to this. “Don’t go to college,” he is famed for advising young ambitious men, “Get into a shop and work out your own salvation.” The fact that invention did not require higher education was perhaps the strongest statement of its democratic custom and effect.\(^{50}\) In short, invention was massively, materially influential: like industrialists, inventors became rich \textit{and} famous without the classic credentials of cultivation, and, on top of this, in the popular, external sphere, the inventions themselves finally helped to make more opportunities accessible to more people, which meant that conditions in America became more democratic. This wedding of invention and democracy was captured by D. H. Lawrence when he complained of democracy, linking it up to Edison’s most significant invention: “The more I see of democracy the more I dislike it. It just brings everything down to the mere vulgar level of wages and prices, electric light and water closets, and nothing else.”\(^{51}\)

While the late-nineteenth-century ideal of “culture” that was being shaped by genteel critics, novelists, philosophers, and educators did include a discourse concerning the vital importance of democracy (we can consider Lawrence an exception), this was more pretense than anything else, for the conditions suggested by this core group were essentially undemocratic. This is to say that, just as within scientific research, only those of the upper class were able to afford the “virtue” of a way of life free of acquisitive concerns and entrepreneurial pursuits, which was, not coincidentally, the only lifestyle deemed worthy by the cultivated set; this educated and predominantly wealthy minority insisted, moreover, that without their guidance, the majority would readily find itself entrapped in what Charles Eliot Norton labeled a “paradise of mediocrities.”\(^{52}\) The overture to democracy thus remained a formal gesture, for it was tempered and ultimately paralyzed by the more dominant anti-acquisitive, anti-materialistic attitude.

Certainly, the ethos of acquisition played a role in the field of invention: it was impossible for inventors to deny that they were profiting from the commercialization of their inventions, and that their scientific research often led to the applications of their findings, yet Tesla and other independent inventors like him were nonetheless annoyed at their critics’
insistence on the higher dignity of science for its own sake. Protesting the connotation of high virtue that went along with the term “pure science,” inventors insisted that their work was equally worthy and that it did indeed contribute to the advancement of scientific knowledge. After reading Rowland’s address “A Plea for Pure Science,” Alexander Graham Bell relaunched the magazine *Science* and declared in the first editorial, “Research is none the less genuine, investigation none the less worthy, because the truth it discovers is utilizable for the benefit of mankind.” Trying, like Tesla, to propagate a view different from Rowland’s, Bell pointed out that inventors had indeed added to the building blocks of physics (consider, he wrote, the electric light and the telephone). Perhaps most significantly, Bell’s words suggest, inventors had contributed to the revelation of “truth.” While the inventor who simply appropriated science for invention might stand on a “lower plane” than the discoverer, Bell conceded, the inventor who advanced knowledge and patented an invention was above them both. Scientists, Bell’s magazine warned, “should cast aside all prejudice against the man of patents and practical devices, and should stand ready to welcome the investigator in whatever garb he appears.”

Often, as I have intimated, this “garb” was not the outfit worn by academics and scholars. It could in fact be anything at all: while Bell’s words are directed specifically at elitist scientists discriminating against those researchers who were trading on their discoveries (in many cases, they had to in order to stay afloat financially), he also implicitly calls attention to an overall prejudice on the part of elite Anglo-Americans against the immigrants who were pouring in from Southern and Eastern Europe and bringing their “garb” with them. Tesla himself came from Croatia, for example, and Einstein, the most famous physicist of the century, was a German Jewish immigrant. Whether in a tallis or rags, most immigrants had little opportunity to enter elite universities at this point (Einstein was an exception, because he was already famous when he arrived in the United States), so if science was an intense interest, it often had to be pursued outside the customary context of higher education, and thus often led to the commercialization of inventions that would support further scientific inquiry. Although Tesla’s words imply that invention was certainly not the vulgar, commercial endeavor it was being billed as by its critics, it was still a living wage for many of its practitioners.

While it was predominantly well-known inventors such as Bell who were outspoken in their defense of a utilitarian, action-oriented approach to scientific discovery, there were scientists, too, who dissented from Rowland’s attitude, partly because the line between science and inven-
tion was more blurry than pure-science activists were willing to admit, but mostly because they found Rowland’s view to be too patrician. For instance, Thomas Corwin Mendenhall, a physicist working in the laboratory of the Weather Service, voiced this divergence when he denounced the “unfortunate and perhaps growing tendency among scientific men to despise the useful and practical in science.” “The arrogance of genius,” he reminded the academics, “is no less disagreeable than that of riches.”

This criticism, entrenched in its reference to economic privilege, was most likely aimed at those men who were claiming—amidst the conspicuous privilege of their lives and backgrounds—that wealth and the refinement of intellect were two separate issues, and that the latter could be acquired (and would be rewarded) despite the absence of the former: those devoted to pure science, Rowland maintained in 1902, comprised “a small and unique” community, “an aristocracy, not of wealth, not of pedigree, but of intellect and ideals.”

This movement to separate refinement from wealth actually pre-dates Rowland’s assertion. Rowland’s specific project of promoting best-science elitism, which imagined itself as a commitment to the setting and enforcement of standards of excellence, was identical to a reform initiative in higher education that proposed a class-neutral ideal of cultivation. Charles Eliot, then president of Harvard University, laid out such a program in *Educational Reform* (1898), stating that “The University will hold high the standards of public spirit and will enlarge that cultivated class which is distinguished not by wealth, merely, but by refinement and spirituality.” This effort to “extend the ideal of culture or cultivation to the ‘public’ involves, first of all, the de-emphasis of wealth as a goal at a time when wealth was no longer restricted solely to the heirs of gentility.” Moreover, by juxtaposing cultivation and materialism, Eliot establishes culture as absolutely abstract, and not at all locatable in anything tangible (such as, say, money), which would suggest the futility of acquiring wealth in the quest to improve one’s class status (think, again, of *Gatsby*). But, even more than this, it should be emphasized that Eliot’s program stresses, in his words, “refinement” and “spirituality,” and these abstractions are, by definition, immaterial, which is to say they are based in contemplation and idealism. It follows that Eliot’s approach to scientific research would be protective of science as an unapplied discipline.

Indeed, Eliot’s thinking can serve as a basic rehearsal of the concerns that this analysis is trying to bring to light. In his later article “The New Definition of the Cultivated Man” (1902), he reiterates and builds on these concerns. He argues that scientific knowledge is an integral part of culture, and that scientific study must be universally accepted into the curriculum
of higher education because, as he and others have suggested, it provides an environment in which students can develop a high-minded devotion to “truth.” If the determination of truth was the goal of a science-friendly curriculum, this meant that science, as the study of nature, became a new tool in the quest to stabilize “truth.” As Eliot wrote in Educational Reform, the study of nature encouraged habits of “candid, fearless truth-seeking,” which meant not only that science was deemed capable of fixing knowledge but also that science had no other job to do but determine “truth.” That is, it had no responsibility to apply its findings, much less play an active role in social affairs. Thus, despite his proposal to “enlarge” the “cultivated class,” he had no intentions of engaging in any kind of program that might challenge the status quo. In fact, it is accurate to say that the goal of social reform, although on the lips of elite educators such as Eliot, retained no elite support during this period if it became politically active. Yet at the same crossroads where Eliot and his contingent were setting up a liberal approach to the budding authority of scientific discourse, claiming that science would bring “truth” and would reflect an overall “aristocracy . . . of intellect and ideals,” a new, more political relationship to science was developing in the philosophy of pragmatism, and it rejected any form of aristocracy.

Proponents of pragmatism pointed out that even an aristocracy of “intellect” needed to be recognized as a function of a class system, and that such an idea could not convincingly divorce the definition of intelligence from the reality of unequal wealth and unequal opportunity. To develop the “mind” was not enough, in the view of pragmatism; there must be a goal beyond this—preferably a concrete agenda of social change. Thus, at the same time that Eliot was redefining “the cultivated man” and proposing abstractly that wealth was not necessary in order to achieve cultivation, John Dewey was proposing the redefinition of intelligence, and suggesting that there could be no abstract definitions of this or any other category that had historically functioned to reiterate class. For Dewey, the reigning concept of “intelligence” was an obvious symptom of class hierarchy, which meant it was a safeguard against a more democratic system. Science, in Dewey’s view, provided the opportunity to forge such a system: it had a material impact on the world in the form of technology, and it favored an outcome-based approach, even in the form of “pure” research. Science helped mark thought as a “working program of action” and should be understood as a tool to be used for the end of social reform. Ultimately, Dewey wrote, “democracy is estimable only through the changed conception of intelligence that forms modern science.”

If, as James Russell Lowell suggested, invention was having a democra-
tizing effect, and was thus leveling “the ancient aristocracy of thought,” invention was playing an important role in changing the dominant conception of intelligence; indeed, an invention, Lowell complains, was responsible for the dissemination of information or thought. Pure science, on the other hand, to the extent that it did manage to retain its detachment (by the 1920s the boundary between pure and practical science had eroded considerably), had less effect on the public. As Rowland proclaimed, it was an “aristocracy” of “intelligence and ideals,” so it intended to remain isolated from social, political, and economic conflicts. It was essentially a private enterprise, and thus represented the privatization of an entire field of knowledge: its discoveries were not meant to be translated into terms that would be readily accessible, either discursively or materially, to those outside its ranks. And while the disapproval of any relationship to the marketplace—the processes of production and commercialization—by pure science does suggest that pure-science advocates were expressing a discomfort with the transitions and commodifications in and of “culture” in the United States, something that certainly had its downsides, the agenda of these advocates made them, as a matter of course, antagonistic to the idea of the public, whether this was their chosen sentiment or not.

The field of invention, by contrast—and by definition—had a direct link to the public and, at its core, sought this relationship. Providing for the public was, and is, the basis for invention (recall Gatsby’s dream to provide something useful to the public by studying “needed inventions”). As Alexander Graham Bell pointed out, the “truth [invention] discovers is utilizable for the benefit” of the public. This sentiment was shared by John Dewey, who argued that the “best” scientific research was the kind that provided the model of a community committed to the socialization of intelligence. “Everything discovered,” Dewey wrote, “belongs to the community of workers”: “Every new idea and theory has to be submitted to this community for confirmation and test. There is an expanding community of cooperative effort and of truth.”

The expansion of this cooperative community, Dewey noted many times, was largely dependent on industrial production, for this was the only way to successfully carry out the publicization of knowledge, which was, in effect, a process of democratization. In other words, a fully democratic society was one in which socialized intelligence prevailed, Dewey insisted, and this goal could be met only with the help of industry. With this point in mind, I now turn to a fictional account of an independent inventor in Frank Norris’s novel McTeague (1899), for in this story can be found a larger, richer narrative about the advancement of a cooperative
community through the procession of industry. Through the character of Old Grannis, Norris presents the dilemma posed to individuality by commercial interests, and charts the course by which the goals of industry and the market instigate a turn toward a more socialistic, participatory, cooperative environment on the part of private citizens or individuals.