The Great American University

Jonathan R. Cole

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Presentation

When most educated Americans think about our great universities, they probably don't think about the origins of lasers, FM radio, magnetic resonance imaging, global positioning systems, barcodes, the Google algorithm, the fetal monitor, the nicotine patch, antibiotics, the Richter scale, buckyballs and nanotechnology, the discovery of the insulin gene, the invention of the computer, or the development of bioengineering through the discovery of recombinant DNA. Nor do they think about improved weather forecasting, cures for childhood leukemia, the pap smear, scientific agriculture, surveying and measuring public opinion, or the concepts of congestion pricing, human capital, and the self-fulfilling prophecy. They almost certainly don't think about the electric toothbrush, Gatorade, the Heimlich maneuver, or Viagra. Yet all these discoveries and innovations have their origins at American research universities.

Most people think of universities in terms of undergraduate and professional education – of teaching and the transmission of knowledge – rather than in terms of the creation of knowledge. This point of view is understandable: Americans are concerned about the education of their children and grandchildren, and they base their understanding of universities on their own experiences in education. Certainly, teaching undergraduate and graduate students is critically important and an integral part of the university's mission. But what has made our universities the greatest in the world is not the quality of our undergraduate education – as important as that is – but our ability to fulfill one of the other central missions of leading universities: the production of new knowledge through the discoveries that change our lives and the world.

In *The Great American University*, I tell the story of how American universities became the greatest engine of innovation and discovery the world has perhaps ever known, how that success was achieved in a relatively short period of time, and how our universities are under threat today. On what evidence do I base the claim that our universities are the best in the world? During the past century, the United States has produced an abundance of creative scientists – more than any other nation.

In numerous surveys and rankings, 80 percent of the top 20 universities in the world are in the United States; American universities make up 75 percent of the top 50 and roughly 60 percent of the top 100. Economist Henry Rosovsky approximated these basic ratios years ago, and the numbers still hold today. There is not one German university in the top 50, nor one Russian university in the top 75 (unless they do their own rankings). By China's own accounting, there are no Chinese universities in the top 200. Furthermore, 60 percent of all Nobel Prize winners in science since World War II have been Americans or foreign nationals working at American universities. The most widely cited scientific literature is dominated by American scientists and scholars. Indeed, American universities have become the envy of the world. Because many of the brightest and most able young people throughout the world want to attend and work at them, our universities may collectively represent the only American industry that currently has a favorable balance of trade.

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Contrary to what most people think, the American research university is amazingly young, and it is highly embedded in the dynamics of the larger American society. It did not originate in 1636, when Harvard University opened its doors, or with the founding of Yale University or Columbia University, though we tend to think of these institutions as old, great universities. In reality, the American research university dates to one hundred years after the signing of the Declaration of Independence, when Johns

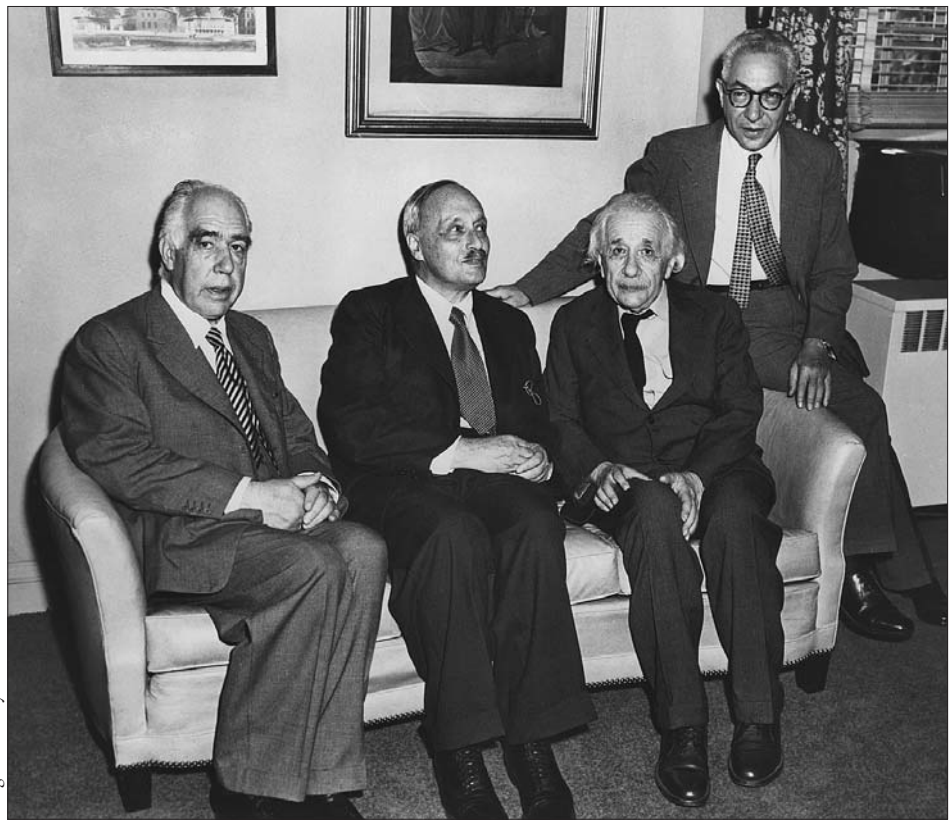

Image courtesy of the Smithsonian Institution

Niels Bohr, James Franck, Albert Einstein, I. I. Rabi

Hopkins University was opened in 1876. Research universities are for the most part twentieth-century institutions. Their growth can be traced to the last quarter of the nineteenth century; by the 1930s, the system's core set of values was in place. The critical period of growth began in January 1933 and took off after World War II. Essential to this growth was a remarkably enlightened postwar science policy – the best in the history of this country, certainly, and maybe in the history of any nation. That science policy provided the impetus for increasing the distinction and preeminence of our universities and paved the way for the life-changing discoveries I cited above. However, I must also emphasize that these institutions are fragile. They periodically come under attack, and I believe they are threatened today.

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The great transformation of the American university took place in 1876. Johns Hopkins was built from a hybrid model based on educational systems in Germany and England. Many nineteenth-century leaders in American education and university life fell in love with the German system. Accordingly, the American system became an amalgam of the German model, which emphasized advanced research, and the British model, which emphasized undergraduate colleges. But in many ways, the American university improved on models that existed elsewhere. For example, it was much less rigid and hierarchical than the German system and was more democratic in its organization and structure. In fact, many of the scientists and scholars who came to the United States from Germany in the 1930s remarked on the openness of the U.S. system. Students could talk to professors, using their first names, and could volunteer to contribute ideas when not necessarily called on. The American system was also far more open to opportunities than the British system in the early twentieth century.

This vision of a new kind of university, fostered by the first president of Johns Hopkins, Daniel Coit Gilman, began to attract the interest of established and prospective scholars in the United States. Gilman, who was not averse to recruiting stars from other institutions, set his sights on places like Harvard. At first, his model was not overwhelmingly well received. Charles Eliot, who led Harvard in the late nineteenth and early twentieth centuries, said the Hopkins and German systems of higher learning would fit Harvard freshmen "about as well as a barnyard would suit a whale." As the competition rose and Eliot anticipated the loss of great faculty members to Johns Hopkins, Harvard's model began to change, as others did elsewhere. That transformation catalyzed a great deal of interest in the new American university.

Along with the influence of the German and other European systems, the late nineteenth and early twentieth centuries witnessed a growing belief in the potential of science and technology. During the Civil War, the federal government became involved with universities. Responding to a demand for agricultural colleges, President Lincoln and Congress passed the Morrill Act of 1862, providing funding for land-grant colleges. The Act – which likely passed during the Civil War because the Southern states were not represented and therefore could not filibuster against it – fostered agricultural revolutions in the United States and made possible the establishment of state universities and research stations.

The emergence of organized academic disciplines further shaped the American university model. At the end of the nineteenth century, presidents of universities, such as Harvard's Eliot or Columbia's Nicholas Murray Butler, took on the responsibility of assessing the quality of academic work at their institutions. As the breadth of knowledge grew, it became increasingly difficult to assess the value of this work. Instead, many university presidents embraced the growth of disciplines, which allowed them to hand off the task of evaluating the quality of work to a set of peers in the appropriate academic disciplines.

All the factors mentioned above led to a social compact between government, the universities, and society. The government, on the one hand, would provide resources and – remarkably – autonomy from government control. This is a remarkable concept: that

government would give resources to universities, expecting certain things from them but trying to remain hands-off. Universities, for their part, would prepare people for more highly skilled jobs, produce better-educated citizens who could participate in the democratic process, and encourage the discoveries that have changed our lives.

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Of the dozen core values I discuss in *The Great American University*, four were central to the developing university system. These values were first formulated during the Enlightenment and the growth of scientific knowledge that occurred, for example, in seventeenth-century England. I should mention that these values are represented as

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ideals; to this day, they are not necessarily entirely approximated. First was the value of universalism, or meritocracy. That is, individuals were to be judged on the quality of their work, not on the basis of any ascribed characteristics, such as gender, nationality, social origins, or race. A second core value was organized skepticism, or the incessant questioning of claims to fact and truth, which meant being open to radical ideas but conservative in determining the methodology needed to demonstrate the fact value of those ideas. Third, universities embraced the free and open communication of ideas, whereby secrecy, prior restraint, censorship, and privileging certain kinds of knowledge were anathema to an open system of communication on which knowledge could be built. A fourth core value was free inquiry and academic freedom, which was not to be viewed as a privilege but as foundational to great universities. Free inquiry was considered essential for releasing the imagination and challenging established orthodoxies and prevailing views in science and society. This principle lies at the heart of the way universities are organized to create their own criteria of excellence, independent of government or external political ideology. Some nations still have not learned that this is a necessary condition for greatness.

It was not just a matter of values, however. Exceptionally talented people were brought into the system from around the globe. Enlightened and bold leadership was extremely important for recruiting talent in the early years. For example, no more than a decade after he founded the University of Chicago in 1892 – using Rockefeller's money, in short order – William Rainey Harper, a tireless recruiter with a truffle-hunting dog's nose for talent, had made the University of Chicago one of the top five research universities in the United States. Eventually, leaders such as Harper, Eliot, Gilman, Butler, and Andrew Dickson White of Cornell University handed over their work to a new set of extraordinary leaders in the 1920s and 1930s.

Beyond leadership, American universities cultivated a strong belief in competition and enjoyed a high level of autonomy from the state. Competition has played a central role in the development of quality in American higher education; indeed, one might argue that competitiveness among elite institutions today has reached problematic heights. Academic free agency dates back to the formation of the University of Chicago, when universities began to compete for outstanding talent. After World War II, as unprecedented public resources were invested to build excellence in the university system, institutional autonomy endured; the impact of this government support was far greater than what private philanthropy or foundations alone could have achieved.

Among the leaders who championed core values in the 1920s and 1930s, two were extraordinarily important. Robert Maynard Hutchins, president of the University of Chicago from 1929 to 1951, was perhaps the greatest champion of academic freedom and free inquiry in the history of American higher education. One anecdote is particularly striking: During the McCarthy period, the state of Illinois attempted to pass legislation that would have made it unlawful for a member or former member of the Communist Party to teach in Illinois public schools or at the University of Chicago. Hutchins gave the legislative committee nothing short of a civics lesson when he testified against the proposal. Indeed, he brought the whole commission to its knees, and the legislation, needless to say, never passed. Hutchins initiated the tradition that believes universities must cultivate a culture of open and free inquiry. He advocated a meritocracy of ideas that is still integral to the culture at the University of Chicago.

James Conant, president of Harvard University from 1933 to 1953, was also a champion of meritocracy. The idea of meritocracy, however, wasn't new: for example, Cornell opened with a broad sense of meritocracy that invited women and minorities to the

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University. Prior to his appointment, Harvard had purged itself of its undergraduate population of Jews. Quotas were set to limit the number of Jewish undergraduates who could attend and remained in effect for many years. Conant transformed the admissions system according to his belief that admissions should be based solely on merit. He defended the conviction that Harvard should recruit students of talent, regardless of means or background. Thus, Conant, Hutchins, and other university presidents of their generation defined these core values as essential to the development of the university system.

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Why do I identify January 1933 as the inflection point for the ascendancy of American universities? It would be a mistake to think that prior to that point there did not exist, for example, a growing body of able young

physicists in this country. The United States had a great deal of young talent – people who, when they traveled abroad, were fascinated by universities in Germany. But when they came home, they were in need of leaders. In the early 1930s, a wave of immigration provided the U.S. system with new leadership. After Hitler came to power in January 1933, the German university system caved in. By April of that year, Hitler had purged, on ideological and religious grounds, the great leaders of the German universities.

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This turn of events, while catastrophic for German universities, was a great boon for American institutions. The United States became the beneficiary of the intellectual migration from Europe that followed Hitler's rise: 50 percent of theoretical physicists emigrated; 25 percent of German particle physicists left. These brilliant thinkers included physicists Albert Einstein, Hans Bethe, and Enrico Fermi; physicist-turned-biologist Leó Szilárd; father of molecular biology Max Delbrück; sociologists Paul Lazarsfeld and Theodor Adorno; writers Thomas Mann and Bertolt Brecht; architect Mies van der Rohe; composer Béla Bartók; and the father of psychoanalysis and his wife, Sigmund and Anna Freud. Some came from Germany, others from Hungary, Italy, and those countries most affected by Hitler's regime. The existing disciplinary communities largely decided where the thinkers ended up: that is, they determined which university would most benefit from each scholar's potential for leadership, based on who was already working on certain issues at that institution. These placements created a new and extraordinary chemistry between thinkers. American universities benefited, on the one hand, from the horizontal mobility of émigré scholars and, on the other, from the vertical mobility of up-and-coming American academics, many of whom were Jewish and came from underprivileged backgrounds.

Along with this infusion of talent, a new science policy was put in place after World War II, laid out in *Science, the Endless Frontier*. MIT engineer Vannevar Bush (no relation to the Bush clan of more recent history), an instrumental figure in developing scientific work to aid the war effort, was the primary author. President Roosevelt inspired Bush to write the report by asking the question: what will happen to American science, engineering, and technology after the war? Scientists who had developed the first nuclear weapons would leave Los Alamos National Laboratory, somewhat discouraged by what they had achieved, to return to university settings, wanting to get away from big science and the first nationally organized scientific enterprise. What would happen then?

Bush, who was Roosevelt's advisor, said, "It's going to be a complete disaster." "Well, let's do something about it," Roosevelt replied. With some help from committees assigned to various tasks, Bush produced the prescient, brilliant, and extraordinarily consequential policy document. First, he advocated for the creation of a National Research Foundation, a government-endowed, independent organization that would subsidize fundamental research in science and engineering – pure science, in particular – after the war. That idea morphed into the National Science Foundation, which was formed in 1950.

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Perhaps even more important, Bush argued cogently for the use of public money to support research at universities – in essence, outsourcing research and knowledge production to universities rather than state-controlled agencies or institutions. A system of peer review, as a measure of quality, would also

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be the domain of universities. He argued for linking research to teaching missions in the universities and laboratories. Today, we emphasize undergraduate education, but we often overlook the forming or curricular teaching that takes place at universities in graduate laboratories. Not only are graduate students contributing to the growth of knowledge, but they are engaged in an interactive form of learning. In this way, the American system differentiates itself from many other systems around the world.

After the war, two university leaders emerged as exemplars of two polarly opposed visions: one forward-looking, the other backward-looking. Frederick Terman, provost of Stanford University from 1955 to 1965, was perhaps the greatest provost in the history of American higher education. A student of Vannevar Bush, he ran the antisubmarine laboratory efforts at Harvard during the war but spent the rest of his career at Stanford. He envisioned how universities would be reorganized and restructured, and he capitalized on that vision. For example, Terman and Stanford President Wally Sterling moved the university's medical school from San Francisco to the Stanford campus in Palo Alto. This happened in the late 1950s, three or four years after Watson and Crick discovered the double-helical form of DNA. Terman realized that the future of medicine was linked to genetics and biology and had the foresight to directly connect the biological sciences with medicine and its applications. Though the move was costly – four buildings at the price of $12 million – it turned out to be a huge success.

Once that project was under way, Terman turned to recruiting. He predicted increasing relationships between industry and the universities; he strengthened engineering disciplines; and he oversaw the creation of the Center for Advanced Study in the Behavioral Sciences, which would bring social scientists to Stanford. He was clever as hell.

Image courtesy of the Barbara McClintock Papers, American Philosophical Society

Barbara McClintock

Image © Corbis

Vannevar Bush

He wanted to recruit young and talented people and bring them in on the cheap. As a member of the National Academy of Sciences, he had access to the ballots of all the young people being nominated to the Academy. He looked for all those who just missed the cutoff and did not get in, and he went after them. He brought them to Stanford; they eventually got elected to the Academy; and they became leaders in their fields, with many of them receiving Nobel Prizes.

In contrast to Terman's forward-looking style, the preeminent historian Jacques Barzun, dean of faculties and provost of Columbia from 1958 to 1967, favored a return to Cardinal Newman's university of the 1850s. He wanted universities to remain sanctuaries, or cloistered enterprises, and was wary of the government's increasing involvement with the research university. Thus, Columbia resisted new developments, undergoing a period of relative stagnation. Columbia resisted the growth of laboratory life and industry-university relations, which were anathema to Barzun.

Terman's vision laid the foundation for Silicon Valley. He didn't originate the term, but he did originate, on campus, the work of Hewlett and Packard, for example. He gave them some space in one of his garages, where they built the first elements of their company. Today, too few universities look, in a systematic way, at their economic impact on their local communities and states. Stanford is one of the few that does, and the University reported in 2008 that faculty members, students, and alumni have founded more than 2,400 companies. A subset, including Cisco Systems, Google, and Hewlett-Packard, generated $255 billion in total revenue among the Silicon Valley 150 in 2008. MIT also tracks its economic impact: in 2008, it reported approximately 4,000 MIT-related companies that employ 1.1 million people and have annual world sales of $232 billion – slightly less than the gross domestic product of South Africa and Thailand, which means that MIT companies form one of the forty largest economies in the world. Moreover, this reporting does not account for the multiplier effect: it is not just the companies, but the services to those companies, that creates jobs.

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At present, the United States has the greatest system of higher learning in the world, especially at the level of elite universities. That said, one threat many people fear is global competition, or the perception that Chinese and European competitors could overtake American universities. This scenario is not imminent. Although some countries have enormous potential for building human capital, the state-controlled systems in Asian and European nations are impeded by an absence of competition; the professoriate is characterized by a state-employee mentality that does not exist in American state universities. Furthermore, some countries have set up systems of internal competition with their own universities. For example, French elites want to send their kids to the École Normale Supérieure, the École Polytechnique, and the other *grandes écoles*, which are far more prestigious than French public universities. In Germany, the state-run universities are second to the Max Planck Institutes, which are run by the central government, are not involved with teaching, and offer better salaries and resources for research. Such internal competition makes countries less competitive globally.

In Europe, the flow of talent is outward, at the moment. The systems there are structurally rigid and do not allow young people to shift their interest or attention to new topics. Research and teaching missions are separate. Take, for example, the French National Center for Scientific Research (CNRS), which is somewhat comparable to the U.S. National Science Foundation or the National Institutes of Health. Scientists at the CNRS have tenure the first day they step into the laboratory. There is no real form of accountability or quality review. Many people run businesses on the side while they hold their CNRS appointments. Moreover, initiating reform in this and other similar societies is difficult.

There is another, equally important dimension to this discussion: we should not fear global competitors. Foreign competition would be good for the American system and the growth of knowledge. Even if the United States did not boast 80 percent of the top 20 universities in the world, we would still have enough. Increased global competition would mean more universities contributing to the growth of knowledge, to finding cures for diseases, and to advancing the welfare of a nation's people. Many such accomplishments would be transferable across national borders.

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If not global competition, then what are the threats to the American university? To paraphrase Walt Kelly's wonderful cartoon character Pogo, "We have met the enemy, and he is us." In the United States, government ideology intrudes into the research processes of the universities, especially in moments of national crisis. During World War I, professors who spoke out against the draft were fired; tenure did not hold much force at the time. Other perceived dissidents were fired during the Red Scares of the 1930s and 1940s. Recent attacks on universities

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go beyond academic freedom of speech to target the research mission itself. Anti-terrorism legislation, specifically the USA PATRIOT Act of 2001 and the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, contains provisions that influence and can curtail scientific research.

The case of Thomas Butler is an interesting example. Butler was one of the nation's leading immunologists working on plague. For twenty-five years, he had transported bacteria from Tanzania and was developing antibiotics that might be used to defend against bioterrorist acts. He was arrested and indicted on sixteen charges for violating the PATRIOT Act. The FBI searched his laboratories, lab notebooks, and tax records – then added fifty additional charges to his case. Eventually, he was fired from his

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university. Despite the fact that the jury exonerated him on all but one minor charge related to the PATRIOT Act, he was convicted of tax evasion, among other infractions, and was sent to jail for nine years. (The sentence was later reduced to two years.) He had to pay his university $250,000 in fines.

The consequences of such actions, which are little known to the wider public, led Cornell physicist Robert Richardson, recipient of a Nobel Prize, to disclose the effects of the PATRIOT Act on research at Cornell. Before the legislation was passed, Cornell had thirty-eight laboratories studying disease- and scourge-causing agents. After two years with the Act in force, and after a number of experiences like Thomas Butler's, only two such labs remained. According to Richardson, "We've got a lot less people working on interventions to vaccinate against smallpox, West Nile virus, anthrax, and any of the 30 other scourges." Thus, anti-terrorism legislation has in fact inhibited research. It has also influenced the composition of university laboratories. A student from Iran – deemed to be a country that supports terrorism – cannot so much as walk into a laboratory that is doing research with select agents without placing the faculty member in charge of that laboratory at risk of criminal indictment and punishment. Consequently, the government is telling faculty whom they can have as graduate students and whom they can hire.

Another major factor is restrictive visa policies. The United States produces so few science and technology majors – certainly not enough to staff both K – 12 programs as well as colleges and universities – that we are in jeopardy of losing the source of great talent that has come from abroad. In fact, 93 percent of public school students in the fifth through eighth grades in the United States are taught the physical sciences by a teacher without a degree or certificate in the physical sciences. In addition, government investigators have endeavored to review and potentially restrain the publication of biology papers, thereby violating the principle of open communication. There has been increased surveillance in university libraries; outside investigators do not have to show probable cause to search library records and computer files, and librarians are not permitted to inform individuals that they are the object of investigations.

External to the universities, the politicization of science and the resurfacing of anti-intellectualism in America have further imperiled important research. The next stage of embryonic stem cell research has been delayed by controversy over whether to develop new cell lines. Global climate research is slowed by government efforts to censor scientific reports by prominent climatologists such as Jim Hansen, whom the Bush administration attempted to muzzle from giving talks because his views differed from its official policy and ideology. In a dramatic effort to promote abstinence-only sexual education, the Bush administration dismantled Centers for Disease Control

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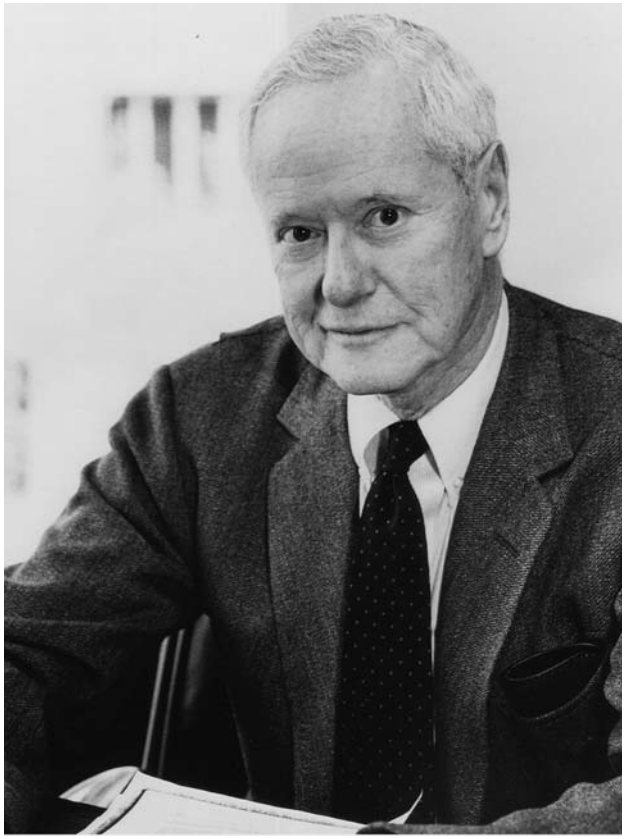
and Prevention websites on reproductive health that mentioned condoms as a method for preventing the spread of HIV. The peer-review system is also at risk, as efforts to name political appointees to the National

Peer Review Committees threaten the system's integrity. In recent years, scholars have come under attack for expressing non-dominant views that challenge American foreign policy.

It is also possible that a lack of funding will dismantle public universities in this country. The University of California, which has long provided access, opportunity, and research quality in one system, is being starved at the moment. California legislators who are voting for this starvation policy do not seem to appreciate its cascading effects. If the university system begins to lose faculty members who are great scholars and scientists, it will lose great graduate students as well as federal and other forms of research money. It will have poorer teachers. It will not produce the spin-off companies that influence and lead to innovation and new high-technology jobs in the local and national economies. The state of California is not alone in its efforts to cut spending, but it provides one example in which legislators overlook the fact that it is infinitely harder and far more costly to rebuild lost excellence than to maintain it.



Robert K. Merton (Image © Sandra Still)

Universities themselves are not immune to internal challenges. First, the commercialization of intellectual property has eroded scholarly impartiality. One hundred years ago, scholars and scientists believed they should not profit from their discoveries. Today, that norm has become obsolete. Most great universities foster the use of intellectual property for good, productive reasons, following the Bayh-Dole Act of 1980 and its 1982 amendment. But given the real and potential conflicts of interest that have been exposed, how do universities reformulate a balance that reinforces essential norms and institutional core values while using intellectual property for the benefit of society?

Second, even in universities that foster open discourse and a marketplace of ideas, there is a tendency to gravitate toward intellectual orthodoxy. If we are honest, there are certain things we just don't talk about openly, even at the great universities. We hear most about a culture of resistance to new ideas on the social, political, and humanistic levels, but it goes on in the sciences, too. New and radical ideas are not acknowledged, and orthodoxy tends to hold forth. The truth is that there is not a huge amount of intellectual courage in American universities. There's not a great deal of it anywhere, but we certainly don't have a superabundance. There is no impulse, as Max Weber said, to recognize and teach inconvenient facts or possibilities.

Third, we have problems with the structural balance required for innovation and excellence. Some of the old structures, which have been in place for a hundred years, are becoming fetters on the growth of knowledge. Information expands much more rapidly than does the university's structural ability to adapt to the free explosion of new knowledge. For example, despite movement toward interdisciplinary work, the sense of control and power that is locked into individual schools and departments inhibits the pursuit of knowledge via multidisciplinary study. Can the university adapt, as any organism must adapt, to environmental changes?

A fourth problem is that the rich are getting richer in this country, not only in the general population but in universities, too. Fifty years from now, perhaps five or ten universities will have substantial endowments that double at the same rate as everyone else's endowment – roughly seven to ten years. If Harvard's endowment is roughly $30 billion, in seven to ten years it becomes $60 billion, then $120 billion. Columbia's endowment of $7 billion doubles to $14 billion, then $28 billion. Eventually, the disparity between great universities and those with far smaller endowments than Columbia, the University of Pennsylvania, MIT, Chicago, or Boston University will have real consequences. Will smaller universities simply become farm systems for a handful of universities that will become the Oxfords and Cambridges? Will real competition be lost, especially in the high-priced, expensive fields?

How do we prevent the skewing of wealth? I would not support taxation, or the sharing of revenues – aside from laboratory work – among the various schools. That would prove disastrous, but some mechanisms need to be found to keep the competition among our great universities alive. (As poor as Columbia's football program has been over the years, I don't think Harvard is interested in giving us money to improve it – or to make us more competitive with them in places where we are competitive, such as neuroscience or art history.) While I believe that President Obama understands the full scope of the university's mission, thus far I am disappointed by what he has been able or willing to do. Certainly, nothing has changed with the anti-terrorism legislation. In fact, in some ways the effects have worsened. The stimulus package was beneficial, but one-time funding is not the same as base funding. The average age

of researchers in the medical and biomedical sciences who receive first-time R01 grants is forty-three; younger scientists cannot operate laboratories independent from their mentors. Those strictures must be attacked if we are going to remain extraordinary and strong.

There are good reasons to believe the United States should be able to maintain its dominant position among preeminent research universities. We should not fear foreign competition, which I believe is not imminent and, at any rate, will be good for the international system of higher learning and for the growth of knowledge once it emerges. I also believe that there continues to be enormous, unrealized potential in the American system. Not all threats are absolute; many simply slow down the rate of improvement. I am interested in the slope of that line: does it continue on an upward trajectory or flatten horizontally? There are choices to be made. If we follow the path taken by many states in dealing with their great universities, the American education system may lose its luster. That is the great test we face, and whether we will pass remains an open question.

Question

European bureaucracies can engage in large scientific projects more effectively than the American bureaucracy. Is this difference a threat?

Jonathan Cole

While this may be true, it seems to me that American scientists are deeply implicated in the very large European projects, as they should be. On the more general level, bureaucratization of the university, in terms of big – almost global – science, is an important problem that we face. Universities add bureaucracy after bureaucracy; the bureaucracies are linked to interest groups; and the interest groups are stakeholders in the university. It becomes increasingly difficult for university leaders to move in any direction without facing opposition to almost any idea that they have. The bureaucratization and the change in scale of the university indeed represent threats.

Question

Could you speak briefly about the challenges that face the social sciences and humanities?

Jonathan Cole

We cannot deal with the sensibilities of being human, of making moral and ethical choices, without an education in the humanities. Increasingly, even large-scale science projects employ philosophers and ethicists who are actively engaged in some of the problems that arise, for example, in the fields of nanotechnology and nanoscience. A great university necessarily integrates the humanities, the arts, and the social and behavioral sciences. This issue is not adequately addressed in my new book, but it is critical to the success of any enterprise seeking greatness.

If the university system begins to lose faculty members who are great scholars and scientists, it will lose great graduate students as well as federal and other forms of research money. … It will not produce the spin-off companies that influence and lead to innovation and new high-technology jobs in the local and national economies.

Question

This week, Barack Obama named the historically black schools as a key segment of our educational system that he wants to invest in. What role do you think those schools will play in Obama's interest in the future of education?

Jonathan Cole

Supporting historically black schools is important. Their graduates have a much higher probability of going on to graduate school and becoming members of faculties.

We have not been good at articulating in a persuasive way the multiple missions and the achievements of our universities.

We are becoming an increasingly diverse society; soon, a majority of the population will be members of minority groups. If we do not begin to tackle persistent disparities, we will face mounting problems, especially in the areas of science and technology development. Beyond supporting historically black colleges, a much bolder plan is needed to sustain the quality of American universities. In *The Race Between Education and Technology*, Harvard economists Claudia Goldman and Larry Katz argue that the United States has excelled in education and technology development in part because it has a record of being open to social mobility and education at the mass level since the beginning of the twentieth century. Historically, as more people finished high school and college, they acquired the skills necessary for jobs in a technological society. We have since lost that edge to European and other nations that have opened up their systems significantly. It is not clear that our K – 12 schools, or even many of the undergraduate programs around the country, can ensure a labor force – as envisioned by Vannevar Bush in *Science, the Endless Frontier* – equal to the task of succeeding in the knowledge-based twenty-first century.

Question

Could you elaborate on the elements of the post–World War II educational policy that you find most attractive? Would these elements still be useful today?

Jonathan Cole

Historians of education often muse on the "golden age" of higher education: the 1960s enjoyed the aftermath of Sputnik and the infusion of increased federal expenditures in science and technology laboratories and research. I'm skeptical about "golden ages."

The same historians who nostalgically look back on the Golden Age of funding during the 1960s often forget to mention that the campuses were torn asunder by ideological disputes, including over the war in Vietnam. Campuses were not harmonious systems where everyone joined together under common values and common objectives. The policies that were represented in postwar science policy were instrumental over the long run in differentiating the American system of higher learning and had an enormous positive effect on the growth and quality of universities here. But once set in motion, these policies did not determine a golden age.

Question

Why have research universities been unable to increase awareness among the broader educated public about the benefits universities bring to culture and society, whether in the sciences or the humanities? What can members of the university community do to increase awareness among the broader public?

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Many leaders of American universities spend seventeen hours a day solving immediate problems and lack the luxury of time. That said, I think they ought to begin to make this case wherever they can in whatever way they can. Part of the reason for my particular point of view in the book was to address the reality that few people out there – including members of Congress and state legislatures – really understand that undermining the quality of universities equates to turning off a pipeline that is essential for national excellence and for the upward trajectory of the quality of life in American society. We have not been good at articulating in an offensive way the multiple missions and the achievements of our universities. Instead, we have played defense against highly esoteric matters, such as indirect cost recovery or claims relating to conflicts of interest. We have failed to realize what mathematician and philosopher Alfred North Whitehead called the "fallacy of misplaced concreteness." We focus on the trees; we do not give people the broader picture of the forest in which the trees are embedded and why it is important to preserve the forest. ■

Jonathan R. Cole, *The Great American University: Its Rise to Preeminence, Its Indispensable National Role, Why It Must Be Protected* (PublicAffairs, 2010)