AMERICAN ACADEMY OF ARTS & SCIENCES

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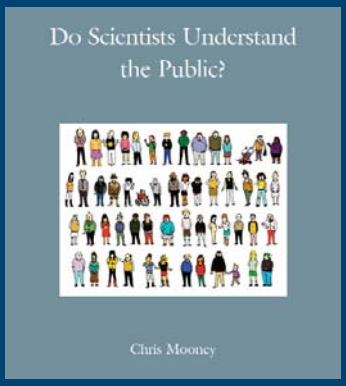


Page 5

Do Scientists Understand the Public?

An Essay by Chris Mooney

based on a project with David Clark, Thomas Isaacs, David Altshuler, and Robert Fri

Page 15

Advances in Brain Science: Implications for Therapy

Emilio Bizzi, Edward Scolnick, and Robert Desimone

Page 29

Black Humor: Reflections on an American Tradition

Gerald Early, Glenda Carpio, and Werner Sollors

with illustrations by Charles Johnson

INSIDE:

Contents

AMERICAN ACADEMY
OF ARTS & SCIENCES

Calendar of Events

Save the Date:

Thursday, September 16, 2010

Meeting – Boston

in collaboration with Boston University

The Great American University

Speaker: Jonathan Cole, Columbia University

Location: Boston University

Friday, October 8, 2010

2010 Induction – Cambridge

Celebrating the Arts and Humanities

Location: House of the Academy

Saturday, October 9, 2010

2010 Induction – Cambridge

230th Induction Ceremony

Location: Sanders Theatre

Sunday, October 10, 2010

2010 Induction – Cambridge

Sunday Symposium

Location: House of the Academy

Wednesday, November 10, 2010

Meeting – Cambridge

On the Economy

Speakers: Robert M. Solow, Massachusetts Institute of Technology; and **Benjamin M. Friedman**, Harvard University

Location: House of the Academy

Saturday, November 13, 2010

Meeting – Chicago

in collaboration with the Chicago Humanities Festival

Part I: *Reproductive Rights*

Time: 11:30 a.m.

Speakers: Reva Siegel, Yale Law School; **Gerald Rosenberg**, University of Chicago; **Christine Stansell**, University of Chicago; and **Geoffrey Stone**, University of Chicago

Part II: *Censored! – The First Amendment, Sex, and Obscenity*

Time: 4:30 p.m.

Speakers: Geoffrey Stone, University of Chicago; **Martin Redish**, Northwestern University; and **Amy Adler**, New York University

Location: Northwestern University School of Law

Wednesday, December 8, 2010

Meeting – New York

in collaboration with New York University

The Role of Universities in Urban Centers

Speakers: Robert Berdahl, Association of American Universities; **Jared Cohon**, Carnegie Mellon University; **Judith Rodin**, Rockefeller Foundation; and **John Sexton**, New York University

Location: New York University

For information and reservations, contact the Events Office (phone: 617-576-5032; email: mevents@amacad.org).

Academy Projects

Update on the Global Nuclear Future Initiative: Diplomats Discuss Nuclear Nonproliferation at Academy Meeting

Every five years, representatives of the 189 nations that are signatories to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) gather at the United Nations to review progress made on the three pillars of the Treaty: nonproliferation, disarmament, and the peaceful uses of nuclear energy.

Historically, the Review Conference has been marked by deep divisions between nuclear haves and have-nots. This year, the American Academy of Arts and Sciences has played a behind-the-scenes role in bridging that rift. By bringing together senior officials from nations that have or are aspiring to have nuclear power, the Academy's *Global Nuclear Future* Initiative has provided a neutral forum for key players to candidly exchange ideas and approaches, free of posturing that often dominates discussion in the public spotlight.

Ambassador **Libran N. Cabactulan** of the Philippines, presiding President of the 2010 NPT Review Conference, joined leaders of the Academy's *Global Nuclear Future* Initiative at an Academy-sponsored meeting held in New York on May 7, 2010. The group also included several former Review Conference Presidents, including Ambassadors **Sergio Duarte** of Brazil (currently the UN's High Representative for Disarmament); **Jayantha Dhanapala** of Sri Lanka (currently the President of the Pugwash Conferences on Science and World Affairs); and **Mohamed Shaker** of Egypt (currently the Vice Chairman of the Board of the Egyptian Council for Foreign Affairs).

Ambassador-level delegates from more than twelve countries attended the meeting, along with the leaders of the Academy's Initiative – **Steven Miller** (Harvard University) and **Scott Sagan** (Stanford University) – and senior project advisors **Robert Rosner** (University of Chicago) and **Stephen Goldberg** (Argonne National Laboratory).

The *Global Nuclear Future* Initiative's distinctive and pragmatic approach to nuclear safety, security, and nonproliferation issues has had a direct impact on domestic and international policy. The findings and recommendations drawn from this work have been requested and cited by senior officials in the White House and the Departments of Energy and State, and have directly informed the work of the April 2010 Global Nuclear Security Summit hosted by President Obama.

The Academy has used its convening power and the wide range of expertise of its members to involve diverse international players in the Initiative. Participants include representatives from nuclear industry and international organizations, as well as from those states now embarking on nuclear power programs whose views and concerns are often overlooked by the international community. The result has been the formation of a new network of policy-makers and scholars dedicated to the security of nuclear energy.

Mohamed Shaker (Egyptian Council for Foreign Affairs), Jayantha Dhanapala (Pugwash Conferences on Science and World Affairs), and Scott Sagan (Stanford University)

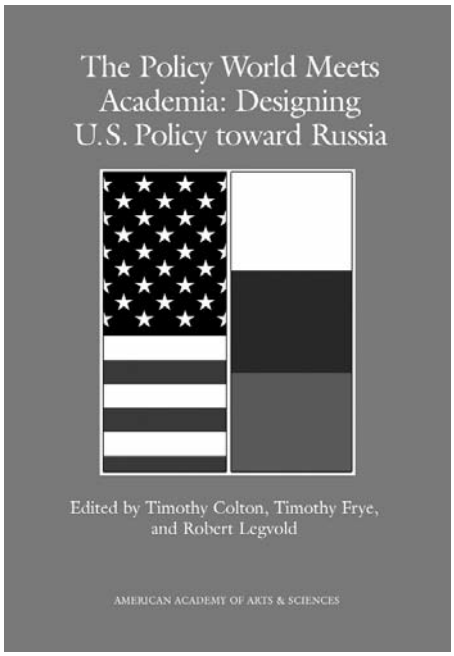
The Academy has held a series of meetings on various aspects of the nuclear future, including an international conference in Abu Dhabi, United Arab Emirates, in December 2009 that focused on the spread of nuclear power in the Middle East. Another international meeting will take place in Singapore in November 2010. It will focus on regional perspectives on current nuclear trends, including the changing nuclear suppliers market and managing the nuclear fuel cycle in a way that takes into account the nuclear development goals of the region. In addition, the Academy has published a widely cited special double issue of its journal *Dædalus* (Fall 2009 and Winter 2010) and a series of Occasional Papers that gather diverse international perspectives on the fuel cycle and disarmament.

Steven Miller (Harvard University) and Libran N. Cabactulan (Permanent Mission of the Republic of the Philippines to the UN)

More information about the *Global Nuclear Future* Initiative is available on the Academy's website at http://www.amacad.org/projects/globalNuclear1.aspx.

This Initiative is supported by Carnegie Corporation of New York, which hosted the New York meeting; the William and Flora Hewlett Foundation; the Alfred P. Sloan Foundation; and Fred Kavli and the Kavli Foundation. ■

U.S. Policy Toward Russia



Over the past two years the Academy has conducted a major reexamination of U.S. foreign policy toward Russia. Under the leadership of **Robert Legvold**, Marshall D. Shulman Professor Emeritus in the Department of Political Science at Columbia University, the study's committee members prepared a strategic assessment of the bilateral relationship and created a blueprint for conceptualizing a twenty-first-century policy toward Russia.

During the first phase of the project, four different working groups explored the security dimension in U.S.-Russian relations, larger questions surrounding the relationship and the challenges facing U.S. policy, questions regarding the issue of structure in the U.S.-Russia relationship, and the increasingly complex and important economic dimension of U.S.-Russian relations.

In the second phase, the project's principal contribution was a series of memoranda delivered to key policy-makers and congressional members on the need for a strategic dialogue with Russia; the importance of, and themes in, a potential presidential address on U.S.-Russia policy; and recommendations for dealing with the conceptual challenge of pursuing an active, engaged policy toward Russia while maintaining an independent, supportive policy toward Russia's neighbors.

Many of the project's steering committee members appeared at outreach events around the country, in Europe, and in Russia. For example, on March 18, 2009, **Eugene Rumer** (Institute for National Security Studies) and **Angela Stent** (Georgetown University) spoke at the World Affairs Council of Houston on "Rethinking Relations with Russia"; on April 17, 2009, at Chatham House in London, **Robert Legvold** gave a presentation on "Can There be a U.S.-European Partnership in Policy toward Russia?"; and from June 30 to July 1, 2009, several committee members participated in a joint seminar in Moscow cosponsored by the Academy, Russia's Council for Foreign and Defense Policy, and RIA Novosti. Several steering committee members also made presentations in Chicago, San Francisco, Seattle, and Washington, D.C.

In the third and final phase of the project, the Academy held a seminar on "The Policy World Meets Academia: Designing U.S. Policy toward Russia" to promote interaction between international relations experts from the university community and policy professionals. The conference was sponsored by the Academy, the Davis Center for Russian and Eurasian Studies (Harvard University), and The Harriman Institute (Columbia University).

A recently published volume, *The Policy World Meets Academia: Designing U.S. Policy toward Russia*, the product of the January seminar, brings academic and policy perspectives to bear on the issues affecting U.S.-Russia relations.

In Part I, essays by scholars **Alexander Cooley** (Barnard College/Columbia University), **Ronald R. Krebs** (University of Minnesota, Minneapolis), and **Jeffrey Mankoff** (Yale University), along with commentary from experienced policy-maker **Thomas Graham** (Kissinger Associates), assess the challenge Russia poses to U.S. policy. In Part II, **Samuel Charap** (Center for American Progress), **Keith A. Darden** (Yale University), and **H. E. Goemans** (University of Rochester) devise policy approaches to the challenge Russia presents, and **Steven Pifer** (The Brookings Institution) provides feedback on the proposed strategies from a policy-maker's standpoint. Part III turns to the practical and political obstacles to designing and implementing U.S. policy, with essays by **Daniel W. Drezner** (Fletcher School of Law and Diplomacy, Tufts University) and **Monica Duffy Toft** (Harvard Kennedy School).

This publication is an attempt to bridge the growing distance between policy-makers and scholars. The volume's editors, **Timothy Colton** (Harvard University), **Timothy Frye** (Columbia University), and **Robert Legvold** (Columbia University), recall in their introduction that "[d]uring the Cold War . . . scholars studying the Soviet Union and American policy-makers were so tightly linked that the boundaries between the two communities often blurred." They express their firm conviction in the value of restoring this once productive relationship, stating that "academia and the policy-making community alike would benefit from institutional mechanisms that would increase communication and cross-pollination between the two."

The Academy is grateful to Carnegie Corporation of New York for its generous support of the U.S. Policy toward Russia project. ■

New Academy Study – The Alternative Energy Future: A Social Science Agenda

Robert Fri

The Academy's project on the Alternative Energy Future is working to identify societal barriers to the widespread adoption of new energy technologies and to assess how these barriers might be better understood and managed. Under the leadership of **Robert Fri** (Resources for the Future), the project will review the current social science support for energy policy; recommend specific steps that the Department of Energy and other federal agencies can take to incorporate social science into their programs; and define a social science research agenda for energy policy.

The Academy convened a workshop on May 11 – 12, 2010, to identify key issues that serve to connect the social sciences with the needs of energy and climate policymakers and that have not been adequately examined by other studies. By bringing together scientists, engineers, economists, political scientists, legal scholars, business leaders, and government officials, the Alternative Energy Future project will address the following six questions:

What are the barriers to achieving social consensus on climate and energy policies, and how can these barriers be overcome? One barrier may be that the benefits of acting to limit climate change are global and intergenerational, while the costs of acting are local and immediate. A second could be the intense and often effective effort of a small group to deny that the benefits are worth the cost, and to confuse the public about the science of climate change.

How do the rules we live by have to change? For example, regulating carbon capture and storage will require a regulatory regime that does not yet exist. In addition, a variety of existing tax policies must be modified so as not to discourage investments to mitigate climate change.

What governance framework will best sustain climate policy over the long run? All levels of government will need to be engaged in the development and implementation of climate policy. However, because diffusion of responsibilities can create costs, balancing federal, state, and local roles will be an important issue in crafting climate policy. A second issue is ensuring the durability and adaptability of federal regulatory structures to new information about science, technology, and policy success.

What will be the impact of climate policy and the energy system transformation on individuals and communities? Technological change could affect household budgets directly, and changes may be required in behavior at the personal, household, or community level. In some cases, these changes may be resisted, and concerns regarding privacy and distributional equity are likely to emerge. Policy-makers must thus consider how best to smooth the transition to a new energy system in order to minimize adverse outcomes.

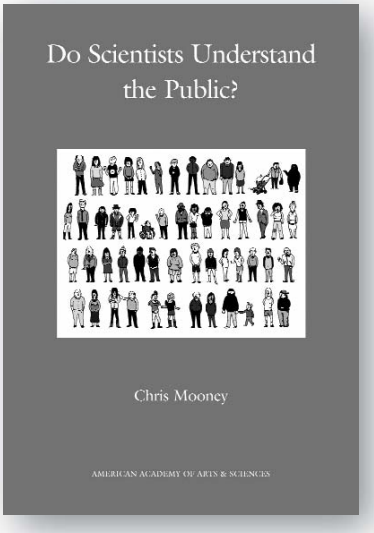
How will America's response to climate change impact our relationship with other nations? How will America's actions on climate change influence the actions of other countries? What issues surround international regulatory structures, and how can we reconcile different cultural values?

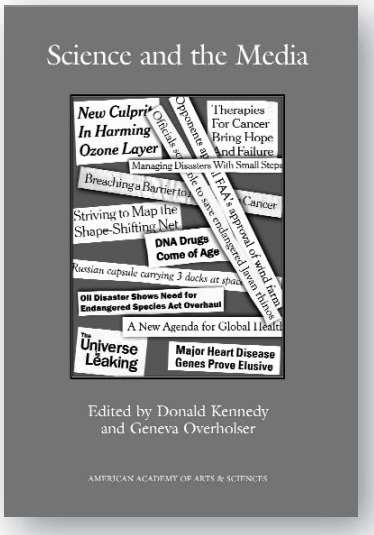
What will be the effect of changing the energy system on other physical systems, including ecosystems, land use, and water supply? What will be the public's response to these changes? Can adverse effects best be mitigated by energy policy, or through changes in management regimes for the affected resource (water policy, for example)?

By focusing on pragmatic recommendations and rigorous assessments of the societal risks and benefits of low-carbon energy technologies, the Academy study will provide constructive guidance to shape the public policies that will govern the large-scale application of these technologies. It will meet the needs of policy-makers by developing recommendations for a social science research agenda designed to fill major gaps in the understanding of the economic, legal, and social implications of proposed changes to the energy system.

Members of the study committee include **Robert Fri**, Resources for the Future (*Project Chair*); **Stephen Ansolabehere**, Harvard University; **Doug Arent**, National Renewable Energy Laboratory; **Jan Beyea**, Consulting in the Public Interest; **Stephen Brown**, Resources for the Future; **Ann Carlson**, University of California, Los Angeles; **Thomas Dietz**, Michigan State University; **Kelly Sims Gallagher**, Tufts University; **William Hogan**, Harvard University; **Robert B. Jackson**, Duke University; **Daniel Kammen**, University of California, Berkeley; **John List**, University of Chicago; **Granger Morgan**, Carnegie Mellon University; **Daniel Nocera**, Massachusetts Institute of Technology; **Richard L. Revesz**, New York University School of Law; **Maxine Savitz**, Honeywell, Inc. (ret.); **William H. Schlesinger**, Cary Institute of Ecosystem Studies; **Adele Simmons**, Chicago Metropolis 2020; **John Steinbruner**, University of Maryland; **Paul Stern**, National Research Council; **Michael Vandenbergh**, Vanderbilt Law School; **David Victor**, University of California, San Diego; and **Leslie Berlowitz**, American Academy of Arts and Sciences. ■

Science in American Society





Several recent Academy projects and studies focus on science in American society: How much does the public know about science and where does it get its information? Do scientists communicate effectively with the public about their work? What role do the media and our education system play in advancing Americans' scientific literacy?

Two recent publications examine these questions.

Do Scientists Understand the Public? is based on the Academy study Improving the Scientific Community's Understanding of Public Concerns about Science and Technology. The volume explores scientists' understanding of their obligation to the broader social contexts in which their work is received; it also considers ways to improve engagement between scientific and public communities. Author **Chris Mooney**, a science journalist and contributing editor to *Science Progress*, contextualizes the discussions of four off-the-record workshops that examined subjects where there is considerable concern about scientific work: The Next Generation of the Internet, Public Perceptions of Nuclear Waste Repositories, The Spread of Personal Genetic Information, and The Risks and Benefits of Emerging Energy Technologies.

Mooney sums up the recommendations that came out of the workshops, asserting that members of the scientific community should demonstrate their interest in the public's views during the early stages of technology development; consider the public's value-based concerns in addition to technical concerns; employ data from social scientists to better understand public attitudes toward science and technology; and generate scientist-citizen dialogues to establish the public's trust.

The essay is reprinted in this issue of the *Bulletin* (see pages 5 – 14).

The Academy thanks the Alfred P. Sloan Foundation for its generous support of the project on Improving the Scientific Community's Understanding of Public Concerns about Science and Technology.

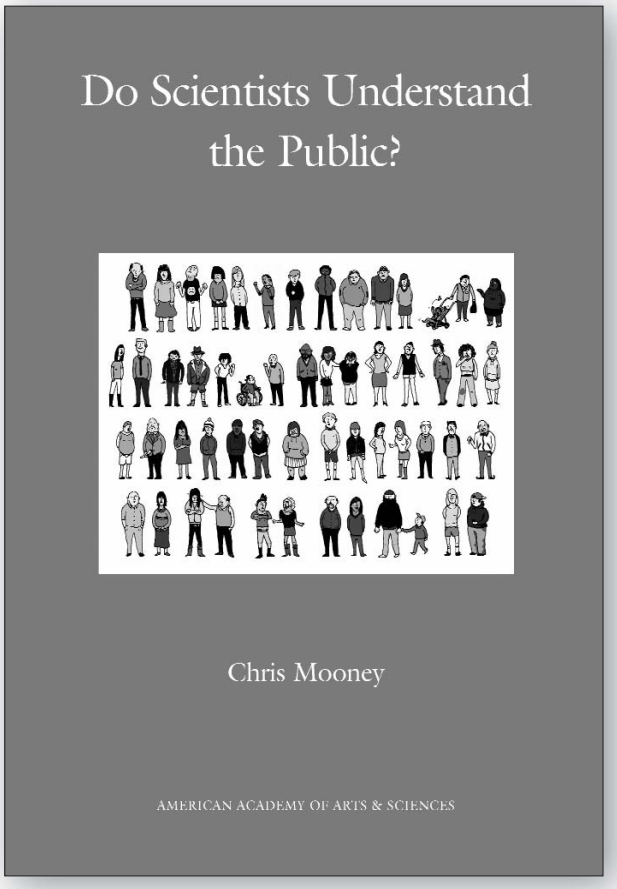
A second publication, *Science and the Media*, part of the Academy's project on The Media in Society, gathers scientists, journalists, and leaders of scientific institutions around the question of how to cultivate Americans' engagement with science and technology. The essays in this volume examine the responsibility of scientists, journalists, and public information officers in communicating about science and technology; demonstrate the relationship between education and scientific literacy; and address the conflicts between journalistic and scientific conventions. As coeditors **Donald Kennedy** (Stanford University) and **Geneva Overholser** (University of Southern California) state in their preface, "[Journalists'] need to grab and hold attention, to write tight stories or produce short segments, can come at the cost of context and nuance."

The volume emphasizes that as advances in science and technology become integral to public policy, widespread scientific literacy is essential to sound policy responses – on issues from climate change to energy policy to new methods of treating disease.

The volume's authors include **Alan Alda** (New York City), **Robert Bazell** (NBC News), **Rick E. Borchelt** (U.S. Department of Agriculture), **Cornelia Dean** (formerly of *The New York Times*), **Lynne T. Friedmann** (Friedmann Communications), **Alfred Hermida** (University of British Columbia Graduate School of Journalism), **Earle Holland** (Ohio State University), **Donald Kennedy** (Stanford University), **Jon D. Miller** (Michigan State University), **Cristine Russell** (Council for the Advancement of Science Writing and Belfer Center for Science and International Affairs, Harvard Kennedy School), and **William A. Wulf** (University of Virginia).

The Media in Society project is supported by a generous grant from the Annenberg Foundation Trust at Sunnylands.

Online versions of these new publications are available on the Academy's website at http://www.amacad.org/publications/occasional.aspx. ■



Do Scientists Understand the Public?

An Essay by Chris Mooney

This essay by Chris Mooney is based on the American Academy study "Improving the Scientific Community's Understanding of Public Concerns about Science and Technology." The project included four off-the-record workshops examining subjects where there is considerable concern about scientific work. Each project workshop focused on a specific area: the Internet, nuclear waste, genetic information, and alternative energy technologies. The workshops brought scientists and technologists together with lawyers, ethicists, journalists, and public officials to explore how scientists understand their obligation to the broader social and cultural contexts in which their work is received, and to examine ways to improve engagement between the scientific and public communities.

We are grateful to the project chairs – David Altshuler, David Clark, Robert Fri, and Thomas Isaacs – for leading these workshops and to the Alfred P. Sloan Foundation for supporting this work. In this essay, Chris Mooney cogently distills this work.

Chris Mooney

In March 2010, some two hundred environmental and climate scientists convened at the Asilomar Conference Center in Pacific Grove, California, near Monterey. Their goal: to head off a mounting conflict between science and the public over the emerging topic of "geoengineering" – the intentional modification of the planet or its climate system to counteract the increasingly dire consequences of global warming.

Over the past several years, as the climate problem has steadily worsened, a growing number of researchers have become convinced that geoengineering options – whitening low-level sea clouds to reflect solar radiation back to space, for instance, or injecting sulfate particles into the stratosphere to achieve the same effect – should be studied and perhaps field-tested on a small scale. These scientists would have us move, cautiously and deliberately, into a world where geoengineering might be available as a last resort, a planetary insurance policy if the warming *really* gets out of control.

But not everyone trusts scientists to exercise wisdom and restraint if handed such powers. Resistance is growing among those who suspect that researchers suffer from a steep case of hubris and are itching to "play God" with the planet. In particular, a Canada-based civil society organization called the ETC Group mobilized a bevy of left-wing organizations to criticize the 2010 geoengineering gathering (an event intentionally meant to echo a famous 1975 Asilomar meeting in which biomedical scientists assembled to set guidelines for research on recombinant DNA). Their sign-on letter labeled the conference organizers "almost exclusively white male scientists from industrialized countries" and implied that financial interests might be pulling the event's strings. The ETC Group has previously charged that scientists are part of a "geoengineering lobby," working in step with those who would make big money from the deployment of planet-altering technologies.

Meanwhile, street protests have taken place outside scientific meetings where geoengineering is under discussion. The battle has begun between scientists and activists to win over the broader public – which, at least for the moment, appears almost entirely clueless. According to survey data gathered by Anthony Leiserowitz of the Yale Project on Climate Change, 74 percent of Americans have never heard of geoengineering.

Another 26 percent say they have heard of it, but most appear to be misinformed, with some confusing it with geothermal energy. Less than 1 percent of Americans appear to know what "geoengineering" really means, or what the fight is truly about.

From a scientist's perspective, members of the public desperately need to understand the scientific basics of a given issue in order to make good decisions about it.

In sum, it's yet another brewing conflict between science and society – one that seems set to explode at an unspecified time in the future, at which point there will be little reason to expect the calm voice of scientific reason to prevail over alarmism, demagoguery, and simple fear.

Here we go again.

* * *

What should the scientific community do when conflicts erupt between scientists and members of the public, as is beginning to occur over geoengineering? A steady stream of rifts has arisen over the years, on topics ranging from climate change and evolution to vaccination and genetically modified foods. In the future, as scientific and technological advances have an increasingly profound influence on policy and society, that stream may become a torrent.

From a scientist's perspective, members of the public desperately need to understand the scientific basics of a given issue in order to make good decisions about it. When scientists find their expertise rejected – especially by activists who seem biased or ill-informed, and who may even have a penchant for street theater – it's a slap in the face, a mockery of their hard work and dispassionate methodology.

One response to such offenses is simply to dismiss the public, to paint average Americans as stupid, scientifically illiterate, or emotional. During the 1970s, Nobel laureate James Watson famously dubbed those hoping to constrain recombinant DNA research as "kooks," "incompetents," and "shits." Another more recent example of such lashing out was captured in the 2006 documentary *Flock of Dodos* by scientist-filmmaker Randy Olson. Olson gathered a group of scientists around a poker table to talk about the anti-evolutionist "intelligent design" movement and how to respond to it. One offered the following strategy for addressing the creationists: "I think people have to stand up and say, you know, you're an idiot."

Whether or not these scientists recognize it, they are working in what science and technology studies (STS) scholars have dubbed the "deficit model." They assume that if only their fellow Americans knew more about science and ceased to be in a state of knowledge *deficit*, a healthier relationship between science and the public would emerge.

Yet there is another possibility: perhaps scientists misunderstand the public and fail to connect in part because of their own quirks, assumptions, and patterns of behavior. Indeed, there is no guarantee that increasing scientific literacy among the public would change core responses on contested scientific issues, for those responses are rarely conditioned by purely scientific considerations. Scientists and nonscientists often have very different perceptions of risk, different ways of bestowing their trust, and different means of judging the credibility of information sources. Moreover, members of the public strain their responses to scientific controversies through their ethics or value systems, as well as through their political or ideological outlooks – which regularly trump calm, dispassionate scientific reasoning.

The powerful influence of politics and ideology is underscored by a rather shocking survey result: Republicans who are college graduates are considerably *less* likely to accept the scientific consensus on climate change than those who have received less education. These better-educated Republicans could hardly be said to suffer a knowledge deficit; a more apt explanation is that they are politically driven consumers of climate science information – and often quite voracious ones at that. They strain information through a powerful ideological sieve and end up loudly supporting a viewpoint that is incompatible with modern scientific understanding.

A more scientifically informed public, then, is not necessarily the same as a public that will side with scientists more frequently. Perhaps what is needed instead is a public that is more familiar, comfortable with, and trusting of scientists; that is more regularly engaged by the scientific community on potentially controversial subjects; and moreover, that is engaged *before* truly fraught conflicts are allowed to emerge.

Fortunately, in recent years the deficit model has begun to lose its grip. A smattering of recent books, with titles like *Don't Be Such a Scientist* and *Am I Making Myself Clear?* exhort researchers to better understand their non-scientific audiences and the often counterintuitive dynamics of communication. In an innovative twist, meanwhile, a much noted 2009 survey by the Pew Research Center for the People & the Press, undertaken in collaboration with the American Association for the Advancement of Science, inverted the traditional "scientific illiteracy" paradigm. The survey not only polled Americans about their views of science but also polled scientists about their views of Americans. Revealingly, it found that while Americans tend to have positive views of the scientific community, scientists tend to consider the public ignorant and the media irresponsible.

Scientists and non-scientists often have very different perceptions of risk, different ways of bestowing their trust, and different means of judging the credibility of information sources.

The resulting headline: "Public Praises Scientists; Scientists Fault Public, Media."

* * *

Possibly the most sweeping effort yet to challenge deficit thinking took shape as a series of four workshops organized over the past year-and-a-half by the American Academy of Arts and Sciences and funded by the Alfred P. Sloan Foundation. Entitled "Improving the Scientific Community's Understanding of Public Concerns about Science and Technology," the interdisciplinary sessions homed in on four areas where conflicts between scientists and the public have either already emerged or seem ready to sprout up: the disposal of nuclear waste, the future of the Internet, the dissemination of personal genetic information, and the adoption of new energy technologies intended to fix our climate crisis and wean us off our dependence on foreign oil.

Members of the public strain their responses to scientific controversies through their ethics or value systems, as well as through their political or ideological outlooks.

Collectively, these four sessions sought to invert the common complaint that the public needs to understand more science; instead, they suggested, perhaps scientists need to understand more *public*. As Stanford University's Thomas Isaacs, chair of the workshop on nuclear waste, put it: "In order to be successful, we have to do more than think we know it all, and our job is simply to tell people – and if they don't understand, then our job is to tell them a little bit louder. That tends not to work." Later in the same session, Eugene Rosa, a public opinion expert at Washington State University, criticized the "hypodermic needle" view of the scientist-public relationship, according to which scientific facts are to be "injected" into Americans almost as if they are in need of medicine – a cure that rarely, if ever, seems to take.

Rather than telling the public to take its scientific shots, the American Academy sessions suggested that if there is a divide between scientists and the public, perhaps *both sides* bear a responsibility for its existence and for bridging the gap. Indeed, scientists and technical experts may shoulder an even greater responsibility, considering their dramatic advantage in the knowledge arena and the funding resources at their disposal. Most important, no one benefits from the too-common practice of lobbing missiles across the "culture war" divide between scientists and various subsets of the American public. This strategy simply leads to damaged trust, a hardening of attitudes, and long smoldering conflicts – the unending battles over the teaching of evolution and the science of climate change being the primary cases in point.

A review of the four American Academy workshops, then, sets us on a path toward a better, less contentious, and more productive means of managing – and heading off – conflicts between scientists and various publics. However, the workshops also show that there is some distance to go before scientists are accustomed to seeing the world through the eyes of the many and diverse groups of citizens affected by their work.

* * *

One of the workshops treated a decades-old and much studied American scientific dispute, one in which a wealth of data and experience can be brought to bear in discussing the causes for rifts between experts and the public: the conflict over how and where to dispose of the nation's spent nuclear fuel and high-level radioactive waste.

Although it is difficult today to remember any other reality, Americans have not always been deeply divided over nuclear power. During the 1950s and 1960s, a nation buoyed by slogans like "Atoms for Peace" overwhelmingly supported its deployment. But in the wake of the Three Mile Island and Chernobyl accidents, and then the conflicts over arms control during the Reagan years, a nuclear divide emerged. For many members of the public, the problem of how and where to dispose of the nation's nuclear waste ranked among the most contentious aspects of the debate.

Perhaps what is needed is a public that is more trusting of scientists; that is more regularly engaged by the scientific community on potentially controversial subjects; and that is engaged before truly fraught conflicts are allowed to emerge.

For an eloquent testimony to this fact, consider the long and dysfunctional history of attempts to establish a national nuclear waste repository at the remote Yucca Mountain site in Nevada. When a 1987 amendment to the 1982 Nuclear Waste Policy Act designated Yucca as the sole site to be studied for its suitability as the nation's central waste repository (removing several other sites from contention), the basis for the choice included highly scientific and technical considerations about geology, hydrology, and tectonic activity, among many other factors. Nevertheless, the legislation was quickly dubbed the "Screw Nevada Bill" by locals, who saw a political ploy to dump on their state. Soon, Nevadans' sense of grievance found political champions like current Senate Majority Leader Harry Reid, who has fought for two decades in opposition to the Yucca plan.

Meanwhile, the U.S. government began to spend what would eventually total $9 billion on the research and infrastructure necessary to establish Yucca Mountain as a nuclear waste repository. Beginning in 1987, teams of government scientists set to work studying the Yucca site as the law required – and found themselves "pilloried on a regular basis" by anti-nuclear activists as well as by many Nevadans, according to Hank Jenkins-Smith, a political scientist at the University of Oklahoma who has studied the Yucca case. The Yucca process, he opines, "was optimized to create as much antagonism [as possible] between the way scientists understood the world and their view or their model of the public."

Nevertheless – and however unwelcome – the research progressed, so much so that the Yucca site has been dubbed "the most studied real estate on the planet." Yet in the last year, it has become apparent that political opposition (which includes dozens of lawsuits) is more than capable of trumping long-term government financial commitments. Although the Bush administration moved to open Yucca by about 2020, the Obama administration has reversed course. Yucca Mountain is "off the table," Energy Secretary Steven Chu remarked recently. In the meantime, the nation's nuclear waste remains in more than one hundred temporary storage facilities located across the country, some quite close to populous areas.

Yucca Mountain is just one example of a long-standing but problematic strategy of identifying nuclear waste disposal sites through an approach that has been called "decide, announce, defend." In the past, sites have been selected through bureaucratic and technocratic processes. Experts, working largely outside the public's ken, have been called on to determine whether they are safe and sustainable. Often these technical decisions are then sprung upon the public – which has resisted strongly.

If there is a divide between scientists and the public, perhaps both sides bear a responsibility for its existence and for bridging the gap.

And no wonder: the different sides approach the issue from different paradigms or worldviews. If scientists who specialize in nuclear issues often feel unfairly attacked by the public, the reality is that for many members of the public, scientific and technical justifications alone – however sound – do not suffice to quell their fears about nuclear waste disposal, its long-term safety, and its proximity to where they live. In other words, on a topic that stirs emotions as much as this one does, the science can very easily be good enough for the scientists but not good enough for everyone else.

The American Academy workshop on nuclear waste highlighted a striking example of this phenomenon. In 1991, the American Nuclear Energy Council launched a Nevada ad campaign that employed scientific spokespersons to convince the public that the Yucca repository itself, and the transport of waste to the site, would be safe. However, observed Eugene Rosa, the campaign backfired dramatically: just 15 percent of respondents in a follow-up survey said the ads made them feel more supportive of the repository. A whopping 32 percent of respondents were moved in the *opposite* direction, and roughly half did not change their opinions. Rather than softening resistance, the ad campaign hardened the views of those who already opposed the repository – precisely the opposite effect from what was intended.

Is there a better model for handling the fraught issue of nuclear waste disposal, and can it lead to a different result than the policy mess – and gigantic waste of time, effort, and taxpayer money – that is Yucca Mountain? Finding such an approach could be especially significant in light of the growing recognition that nuclear power, because it is carbon-free, is likely to serve as a core component of any future solution to our intertwined climate and energy problems. No matter how strongly desired, a "nuclear renaissance" will not be possible without a resolution to the problem of waste disposal.

A different approach to managing potential conflicts over nuclear waste has been attempted in Canada, under the auspices of the country's Nuclear Waste Management Organization (NWMO). Instead of "decide, announce, defend," the new approach is "engage, interact, cooperate." Founded in 2002, the NWMO undertook a sustained three-year program to engage the Canadian public on how to dispose of nuclear waste and to consider – sometimes over scientists' objections – the public's views on the ethics and societal implications of any waste disposal decision. The NWMO also explicitly promised that every community would retain veto power over the location of a waste site in its neighborhood or vicinity.

While the final decision on Canada's waste repository site has not yet been made, those involved in the NWMO process report that, thus far, even critics have remained engaged and supportive. Dialogue has not broken down; rather, it has been fostered and strengthened.

There is some distance to go before scientists are accustomed to seeing the world through the eyes of the many and diverse groups of citizens affected by their work.

This kind of thinking is also becoming increasingly prominent in the U.S. context, where the Nuclear Regulatory Commission (NRC) has undertaken new measures to strengthen public support of its activities. According to Janet Kotra, head of the NRC's High-Level Waste Public Outreach Team, these steps include improving the ability of government scientists to engage with citizens in well-designed, effective public meetings. As Kotra put it at the American Academy meeting: "I will never forget a former colleague who said, 'You mean, I have to dumb down my presentation for Ma and Pa Kettle?' And of course, the answer to that is, yes, if you see it that way. But if you see it that way, I don't want you talking to them."

* * *

If scientists want to better connect with the public on its own terms, improved communication will be vital to their success. As Thomas Isaacs stated at the conclusion of the nuclear waste workshop, "I think we're talking the talk and we're starting, some at least, to walk the walk. But that's the challenge that remains."

To unseat the deficit model and get scientists and the public talking on equal terms, a variety of institutional barriers must be overcome. One problem is that the incentive system in science remains highly inimical to greater public engagement. Scientists who value or excel at public outreach often face the explicit or implicit scorn of their peers, for whom success in technical research is the epitome of scientific achievement and all else is secondary or even a waste of time.

While attitudes may be slowly changing in the academy, most young scientists today are still largely trained in the mould of their professors – although, as we'll see, some are beginning to rebel.

Furthermore, science journalism – supposedly the means of bringing scientific information to the public so that scientists don't have to – is in steep decline, at least within traditional media institutions like newspapers and television news networks. This fact makes improving the communication and outreach abilities of scientists more crucial than ever: increasingly, there is no one else to do this work for them.

How exactly should scientists go about engaging different segments of the broad American public? The nuclear waste workshop participants noted two separate communication roles for scientists, both of which are vital (and both of which have been neglected in the past). One is slow, steady engagement with the public on issues of concern – being available, being open and ready to listen, and working to defuse conflicts before they begin. Another is crisis communication, so that if and when a major event occurs with the potential for a long-term or dramatic impact on public opinion (such as the Three Mile Island meltdown in the nuclear arena or, in the realm of climate change, the infamous "Climate Gate" scandal over scientists' stolen email messages), representatives of the world of science are able to respond quickly before irreversible damage is done.

If scientists want to better connect with the public on its own terms, improved communication will be vital to their success.

The nuclear waste workshop drew heavily on the work of social scientists, public opinion researchers, and media specialists (including current and former journalists). If scientists wish to better prepare for potential conflicts with the public – and manage existing ones to achieve better outcomes – it will be essential to involve these "experts." True, they do not hail from the hard sciences. But they have much needed skills: the ability to determine where different subsets of the public stand on a particular issue based on survey data, for instance, and experience studying issue cycles and patterns of media coverage so as to determine where the tipping points may lie and which types of arguments, or frames, seem to be gaining or losing momentum as public debate progresses and evolves. For example, social scientist Matthew Nisbet of American University has demonstrated that with any nascent science-policy issue (geoengineering and nanotechnology are good examples), a series of latent meanings are already present in public discourse that could gradually harden into dominant views on the matter.

Understanding the terms of a science-policy debate before it goes fully public – and grasping how a particular interpretation of the issue could rise to the fore due to a confluence of media coverage and pivotal events – would better prepare scientists for managing the issue before it becomes widely contested. This point deserves close attention from scientists thinking about geoengineering, and should also guide our interpretation of two other American Academy workshops devoted to gaps between scientists (or technical experts) and the public. Both workshops focused on areas where scientists have already begun to anticipate future policy issues or conflicts, but where the public seems largely unaware or ill-attuned. One concerned the evolution of the Internet. The second covered the uses (and misuses) of personal genetic information in an age of "personalized medicine" and direct-to-consumer marketing of genetic tests for a variety of purposes, ranging from studying one's ancestry to uncovering potential health risks.

* * *

In the American Academy workshop "The Next Generation of the Internet," participants seemed less certain than the nuclear waste experts about how to approach the inversion at the heart of the undertaking: the idea that scientists (and, in the case of the Internet, technical experts) need to understand the public, and not just vice versa. Nevertheless, the vast gap between skilled Web technologists and average Internet users was immediately recognized. "Many Internet experts or computer scientists are not trained in human behavior," opined meeting chair David Clark, an Internet expert at MIT. "They understand the public interacts with the Internet differently, yet lack the training to effectively incorporate public behaviors into Internet design."

To get scientists and the public talking on equal terms, a variety of institutional barriers must be overcome.

Experts and citizens also differ widely in their outlook on the Web's future. Experts tend to be much more concerned about issues of privacy and security than most members of the public, who seem to want the Internet simply to function as a reliable utility and don't appear to worry much about entering their personal credit card information or social security numbers on any number of websites. This lack of concern raises a potentially troubling question: how would a public that thinks of the Web largely as a utility – an appliance – react to a future in which governments impose identity requirements for Web use, essentially requiring every user to be identified by the equivalent of a driver's license? Perhaps they would not worry about such a development nearly as much as they should.

The overwhelming impression conveyed by the "Next Generation of the Internet" session was that many potential problems involving security, personal identity, and privacy could develop as the Internet evolves – problems that experts can begin to anticipate but that the average citizen scarcely considers or worries about. What kinds of public reactions might be expected if any of these issues were to explode and become a matter of mass media coverage or crisis? How might we prepare citizens for different eventualities of the Internet's future? That was a subject the session largely left unresolved.

Similar questions emerged from the American Academy workshop on the "Spread of Personal Genetic Information." As human

genome sequencing becomes faster and cheaper due to inexorable technological advances, it is becoming possible to envision a *Gattaca*-like world in which knowledge of one's own genetic makeup is a given, not only to oneself but potentially to others as well. Indeed, in the past half-decade genetic testing companies like 23andMe and DecodeMe have begun marketing their wares directly to consumers, but many experts wonder how valuable the information provided can be without the help of a skilled interpreter or genetic counselor. Still, some citizens will undoubtedly seize upon the results and may use them to shape their health choices.

As we move into this new world, scientists caution that there is a "mythos of the gene" that has led much of the public to think of individual tracts of DNA as directly linked to particular traits or disease susceptibilities. "There is very good historical evidence from about 100 years ago to today that the public has a very powerful notion of the influence of genes and attributes to it much more power really than the scientific community does," noted Philip Reilly, Chief Medical Officer of Genetix Pharmaceuticals in Cambridge, Massachusetts.

Understanding the terms of a science-policy debate before it goes fully public would better prepare scientists for managing the issue before it becomes widely contested.

While observable traits certainly run in families – as do diseases – in many cases their emergence, expression, and characteristics are conditioned by hundreds, sometimes more than a thousand, separate genes, as well as by interactions with the environment and random events in human development. The increasing speed and declining cost of gene sequencing provide some access to this complexity, but the information revealed may not be particularly profound: it is not as if any single gene "causes" anything in the vast majority of cases. Yet members of the public may latch on to newly revealed genetic information anyway and scurry with their 23andMe reports straight to their doctors, who may not know how to handle or advise about the results.

Many other potential problems could arise in a world of cheaper, easier, and largely unregulated access to personal genetic information. Will there be discrimination based upon one's genes? Will there be more terminations of pregnancies based on five-week fetal genome sequencing and the alleged "flaws" it reveals? Will law enforcement agencies have universal DNA databases for all citizens? Will particular genetically based diseases become linked to particular races – echoing eugenics, Tuskegee, and other nightmares of the earlier days of genetics and biomedical science? Certainly, one of the most important recognitions about the "public" that came out of the workshop is the fact that particular segments, such as the African American community, have very good, historically grounded reasons to be suspicious of medical research and advances, particularly with regard to genetics.

In general, however, the personal genetics session featured a fair amount of "hand waving" about what the public does and does not believe about genetics. "A number of us have said, 'The public believes this, the public believes that,'" objected Harvard psychologist Steven Pinker at one point. "But what is our evidence for what the public believes? In my experience many scientists have a condescending attitude towards what the public believes." While the assembled scientists and experts could envision many potential flashpoints in the future of personalized genetics, they were less able to describe with any certainty how the public would respond to such controversies or scenarios – much less how scientists might *prepare* the public for these situations.

To be fair, the genetics workshop participants knew well what they didn't know. As Duke University's Huntington Willard put it, "There's a thousand publics out there that one could address, any of whom has to be understood by the scientists in order to know how to deal with them, how to work with them, engage them, try to benefit them and be benefited by them." It sounds, in short, like a research agenda.

* * *

From this survey of three out of the four American Academy workshops on scientists' understanding of the public, general patterns begin to emerge. On issues where a long-standing conflict exists between scientists and the public – such as nuclear waste disposal – social scientists have also been long engaged and have conducted considerable research on the conflicts and corresponding public views. What's more, scientists are probably more likely to be conversant with this social science research, and can perhaps glean from it a better path forward.

On issues that are new and emergent, there is comparatively less solid research available to help scientists glean what the public "thinks" and how it is likely to respond to future controversies.

But decades into such debates, the political and societal rift already exists. The crisis-communication opportunities have probably been missed or squandered, and much analysis is retrospective and "woulda, coulda, shoulda" in nature. Battle lines have hardened (as in the Yucca Mountain case), and it may be far too late to "fix" the situation.

On issues that are new and emergent, by contrast – the future of the Internet, the spread of personal genetic information, geoengineering – there is comparatively less solid research available to help scientists glean what the public "thinks" and how it is likely to respond to future controversies. The experts are able to glimpse, or at least imagine, what some of these controversies might look like. But they are unaccustomed to mapping them onto existing public opinion configurations or understandings and, in many cases, are not particularly comfortable with doing so. Moreover, the requisite data and social science analyses may not exist in the first place.

The obvious suggestion, then, is that scientists and social scientists should team up *earlier* in the issue cycle and figure out – together – how to envision different scenarios in which a nascent field of science may impact or alarm society. They should do so based on a well-researched and *scientific* sense of where the public stands and where it is likely to move when prompted by events. Such an anticipatory approach would not only better serve the public, it would have the added benefit of enabling the scientific community to prepare for any crises or conflicts that may occur.

In other words, a forward-looking collaboration is needed between research scientists, social scientists, public engagement experts, and trained and skilled communicators. The latter may or may not be scientists, but they should be ready to move, on a moment's notice, to address controversies and concerns. Meanwhile, in the absence of any pressing conflagration, public engagement initiatives could help sculpt a citizenry that will be less likely to distrust the scientific community, or reject its expertise, and more willing to understand the scientific perspective (so long as scientists approach the public openly and take citizens on their own terms).

A forward-looking collaboration is needed between research scientists, social scientists, public engagement experts, and trained and skilled communicators.

In the competitive world of academia, how would such a forward-looking research-and-response infrastructure be established? How would it move gingerly across policy areas and disciplinary divides? As it happens, precisely such an initiative already exists – for one scientific issue, anyway. That issue is nanotechnology. The National Nanotechnology Initiative (NNI) is an interagency research effort that was launched in 2000 and organized and given greater prominence by the U.S. Nanotechnology Research and Development Act of 2003. This law requires federally funded research on the societal impacts of nanotechnology, thereby codifying an impulse already strongly present at the NNI's creation: that it should foster interdisciplinary research and sustained efforts in public engagement.

Why was the central U.S. initiative to fund nanotech research – an innovative technology that we hope will generate economic growth and new industries, if not a "new industrial revolution" – so sensitive to societal impacts? Nanotechnology had been viewed for some time as a potential subject for future controversy; many feared it would be the next "GMO" issue. With the release of Michael Crichton's 2002 novel *Prey*, in which nanobots wreak havoc, and Sun Microsystems cofounder Bill Joy's 2000 warning in *Wired* magazine about a world of "gray goo" that could result from nanotech run amok, the groundwork seemed well prepared for such an outcome.

Therefore, the NNI has focused heavily on engaging social science researchers to undertake the anticipatory work that will allow us to imagine how a future full of nanotech innovations may evolve and to envision the public's place in that future. As David Guston, the head of the NSF-funded Center for Nanotechnology in Society at Arizona State University, explains, "We structure dialogues between scientists, engineers, social scientists, stakeholders, and users around a variety of different socio-technical trajectories in a given technological space." Indeed, the 2003 Nanotechnology Research and Development Act is, according to Guston, the first piece of U.S. legislation that instructs researchers to conduct social science alongside pure science and engineering work and to involve the public and determine what its values are in connection with nanotechnology. The model provides much to build on, and could easily be applied to, say, synthetic biology research and (perhaps especially) geoengineering research.

But the NNI is not the only positive sign on this front. There is also a demographic and educational phenomenon occurring right now at universities across the country that could be turned to the advantage of those who wish to bring scientific research, and scientists, into better contact with society. Surveys of young university scientists show that many would like to do something *other* than follow in the research footsteps of their mentors – especially at a time of fierce competition for a relatively small number of traditional academic jobs. In a recent survey of one thousand graduate-level science students at a top research institution (the University of California, San Francisco), less than half

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designated academic research as their top career choice. Instead, these young scientists are often interested in public engagement and communication, but face limited career opportunities to pursue these goals.

In other words, if there is a crying need to forge better connections between scientists and the public, there is also an army of talent within universities looking for such outreach work. That base is young, optimistic, and stands ready to be mobilized.

* * *

The final American Academy workshop, which delved into issues surrounding climate and energy, neatly blended many of the characteristics of the workshops discussed above. On the one hand, it addressed a much studied and long-standing science-society problem, one where it is far too late to stave off massive, entrenched conflict: global warming. Anthony Leiserowitz of Yale University, a leading expert on climate change and public opinion, made this point crystal clear in his presentation. Leiserowitz has classified Americans into six now-famous groups based on reactions to the issue; as of January 2010, his results were as follows:

"alarmed" (10 percent), "concerned" (29 percent), "cautious" (27 percent), "disengaged" (6 percent), "doubtful" (13 percent), and "dismissive" (16 percent). (Disturbingly, the last group has grown dramatically from just 7 percent in 2008, as climate-science denial has experienced a strong resurgence.)

As Leiserowitz's results suggest, we understand the public very well on climate change. We know Americans are thoroughly polarized and view the issue through partisan lenses – which explains why better informed and educated Republicans are more likely to reject modern climate science, whereas better informed and educated Democrats respond in precisely the opposite fashion.

At the same time, the session also showed that despite the seemingly irreversible political polarization of the public around climate change, there is much greater potential to achieve solutions if the issue is reframed around new energy innovations. Americans

Fortunately, there are scientific means available for studying the public and how it responds to scientific controversies – which can only mean that in the long term, scientists will surely come to embrace them.

are broadly in favor of advancing energy technologies, regardless of their political affiliation. (This finding neatly explains the recent trend in leaving the word "climate" out of the title of various pieces of energy legislation in the U.S. Congress.)

If we are going to throw our weight behind a variety of energy innovations, from wind farms and solar installations to smart meters and electric cars, now is the time for scientists and social scientists to work together to anticipate the kinds of public resistance that may emerge to aspects of the new energy future. The American Academy session did just that. To give but one example, the session featured a revealing presentation, by Roopali Phadke of Macalester College, about the growing anti-wind energy movement, which is motivated by a set of aesthetic concerns about the marring of landscapes that scientists and the wind industry have often treated lightly or callously. Phadke suggested that the American anti-wind movement is "growing at a rapid pace" and is mobilizing around a common platform of concerns. Statements by opposition leaders also suggest that future campaigns are less likely to take the form of polite protests and may consist of more "direct actions" against wind farms. (Incidentally, controversies over wind power installations recall a lesson from the nuclear waste saga: don't spring a wind farm on a community unawares.)

Happily, social science research is already in progress on how members of the public are responding, or are likely to respond, to new energy innovations – for while Americans express strong support for these innovations, all humans also have a tendency to resist change when it is thrust upon them quickly, as some of these technologies may be.

Moreover, whether old or new, energy systems require large facilities, which have to be put somewhere. Thus, while the public may support less carbon-intensive fuels in theory, there may also be great resistance to attempts to obtain large volumes of natural gas from newly reachable shale resources, often located in parts of the country (Michigan, the eastern United States) that are not accustomed to major extraction endeavors. Similarly, capturing carbon dioxide and removing it from the atmosphere sounds wonderful in theory – but then it has to be stored, likely underground and perhaps in close proximity to a community that feels uncomfortable with the idea.

Ensuring a new energy future does not merely require an understanding of the potential for resistance to new sources of power, or new technologies for environmental cleanup. We must also understand how members of the public make energy decisions on an individual and household level, where dramatic efficiency gains (and emissions reductions) are possible. If there was one extremely heartening theme from the American Academy meeting it was that this, too, appears to be a major growth area for research. As Jan Beyea, an independent scientist, put it after a presentation on public adoption of smart meters, smart appliances,

What is ultimately needed is a systematic and forward-looking way of gathering diverse thinkers – who can peer ahead at scientific issues, identify impending controversies, and determine methods for staving off conflict.

and new auto technologies: "Almost every study I cite is 2009. This area has exploded. . . . This is the time to be in it, and I hope we can head off some of the problems ahead of time."

* * *

Overall, the four American Academy sessions represent a critical step in forging a more fruitful relationship between scientists and the public. They demonstrated how little scientists often know or understand about non-scientific audiences and technology users – and yet, at the same time, also highlighted the fact that there is reliable data on the public to be obtained, a sound methodology for doing so, and many opportunities for research collaborations awaiting those who wish to undertake such projects.

As this knowledge takes hold, the hope is that it will produce more than just interdisciplinary research. What is ultimately needed is a systematic and forward-looking way of gathering diverse thinkers – from the hard sciences, the social sciences, and among communication specialists – who can peer ahead at scientific issues, identify impending controversies, and determine methods for staving off conflict. Needless to say, these researchers will also necessarily have studied, in great detail, what can be learned from past mistakes on issues such as nuclear waste disposal or climate change.

In sum, scientists and their institutions must set up an integrated system of research *and action* that will anticipate future problems and determine how to handle them. If the goal is to preserve public trust or to head off conflicts before they become so fraught that there is no chance to defuse them, then reactive measures will not suffice.

Fortunately, there are *scientific* means available for studying the public and how it responds to scientific controversies – which can only mean that in the long term, scientists will surely come to embrace them. ■

Chris Mooney is a science and political journalist and a contributing editor to *Science Progress*. He is author of *The Republican War on Science* (2005), *Storm World: Hurricanes, Politics, and the Battle Over Global Warming* (2007), and *Unscientific America: How Scientific Illiteracy Threatens Our Future* (with Sheril Kirshenbaum, 2009). Mooney and Kirshenbaum are also coauthors of The Intersection, a blog for Discover blogs. Mooney's essays have been nominated for a National Magazine Award and featured in *Best American Science and Nature Writing 2006*. He has been a visiting associate in the Center for Collaborative History at Princeton University and a Knight Science Journalism Fellow at MIT (2009 – 2010). For Summer 2010, he is a Templeton-Cambridge Fellow in Science and Religion.

Improving the Scientific Community's Understanding of Public Concerns about Science and Technology

STUDY WORKSHOPS

The Next Generation of the Internet

David Clark, *Massachusetts Institute of Technology* – Chair

The rapid pace of technological change leads to a high degree of uncertainty for users of the Internet. The working group examined issues of identity on the Internet; attribution and provenance of information communicated via the Internet; rights and ownership of personal data; and the Internet and child protection.

David Clark is Senior Research Scientist at the MIT Computer Science and Artificial Intelligence Laboratory. Since the mid-1970s, Clark has been leading the development of the Internet. His recent projects include extensions to the Internet to support real-time traffic; explicit allocation of service; pricing and related economic issues; and policy issues surrounding the Internet. Clark's latest research activities focus on the architecture of the Internet in the post-PC era. He is former chairman of the Computer Science and Telecommunications Board of the National Research Council and has contributed to a number of studies on the societal and policy impact of computer communications. Clark is the chair of a new Academy study on Protecting the Internet as a Public Commons. He is a Member of the National Academy of Engineering and a Fellow of the American Academy of Arts and Sciences, Association for Computing Machinery, and IEEE.

Workshop Participants:

Elise Ackerman, *Journalist*
Susan Athey, *Harvard University*
Marjory Blumenthal, *Georgetown University*
Scott Bradner, *Harvard University*
Daniel Geer, *Geer Risk Services*
John B. Horrigan, *Federal Communications Commission*
Paul Resnick, *University of Michigan*

Public Perception of Nuclear Waste Repositories

Thomas Isaacs, *Lawrence Livermore National Laboratory and Stanford University* – Chair

If nuclear power is to play an increased role in meeting the nation's energy needs, it will be essential to provide for the disposal of the spent fuel generated by nuclear power plants. However, no operating facility for permanent disposal of this material currently exists. The working group examined the difficulty of demonstrating to the public that a repository will be safe and the difficulty in achieving public acceptance of a location for such a repository.

Thomas Isaacs is Director of the Office of Planning and Special Studies at the Lawrence Livermore National Laboratory and a Consulting Professor at the Center for International Security and Cooperation at Stanford University. His career with the Department of Energy spanned more than two decades. He has managed many policies and programs that advance nuclear power and issues associated with security, waste management, and public trust. He is the Research Coordinator for the American Academy's Initiative on the Global Nuclear Future.

Workshop Participants:

Kennette Benedict, *Bulletin of the Atomic Scientists*
Wesley Cragg, *York University*
Cornelia Dean, *The New York Times*
Elizabeth Dowdeswell, *University of Toronto*
Ted Greenwood, *Alfred P. Sloan Foundation*
Hank C. Jenkins-Smith, *University of Oklahoma*
Carl Kaysen,† *MIT*
Carol Kessler, *Pacific Northwest National Laboratory*
Janet Kotra, *Nuclear Regulatory Commission*
Thomas Leschine, *University of Washington*
Charles McCombie, *Arius Association*
Steven Miller, *Harvard University*
Ivan Oelrich, *Federation of American Scientists*
Eugene A. Rosa, *Washington State University*
Robert Rosner, *University of Chicago*
Eugene Skolnikoff, *MIT*

† Deceased

STUDY WORKSHOPS

The Spread of Personal Genetic Information

David Altshuler, *Broad Institute; Harvard Medical School; Massachusetts General Hospital* – Chair

Recent progress in human genetics and genomics has led to an explosion of genetic testing for numerous diseases and conditions, in both medical and direct-to-consumer settings. Personalized genomic testing provides a mix of complicated and often incomplete information, the uses and implications of which are not yet fully understood. The working group examined the implications of the widespread availability of this information, the lack of regulation of such services, and the impact of these short-term uses on longer-term scientific goals.

David Altshuler is a clinical endocrinologist, human geneticist, founding member of the Broad Institute, and Director of the Broad's program in Medical and Population Genetics. He is also the Institute's first Deputy Director and Chief Academic Officer. Altshuler is Professor of Genetics and of Medicine at Harvard Medical School, and a member of the Department of Molecular Biology, Center for Human Genetic Research, and Diabetes Unit at Massachusetts General Hospital. He has been a lead investigator in numerous public-private partnerships that have mapped human genome sequence variation as a foundation for disease research. He is a councilor of the American Society of Clinical Investigation and a member of the Advisory Council of the National Institute of Diabetes and Digestive and Kidney Diseases of the NIH.

Workshop Participants:

Emilio Bizzi, *MIT*
Vence Bonham, *National Human Genome Research Institute*
Lisa Sowle Cahill, *Boston College*
Amelia Chappelle, *Genetic Alliance*
Gideon Gil, *The Boston Globe*
Hank Greely, *Stanford Law School*
Steven Pinker, *Harvard University*
David Reich, *Harvard Medical School*; *Broad Institute of MIT and Harvard*
Philip Reilly, *Genetix Pharmaceuticals*
James Schwartz, *Independent Scholar and Writer*
Fintan Steele, *Broad Institute of MIT and Harvard*
Jennifer Weisman, *U.S. Department of Health and Human Services*
Huntington Willard, *Duke Institute for Genome Sciences and Policy*

The Risks and Benefits of Emerging Energy Technologies

Robert Fri, *Resources for the Future* – Chair

Population growth and the threat of global climate change have created the need for alternative energy sources. Addressing the growing energy demand will require a combination of old and new energy sources, including solar and wind power, hydroelectric power, biofuels, liquefied natural gas, and nuclear energy. In addition to accepting new forms of energy supply, the public will be asked to change its energy consumption. The working group considered how to balance the concerns of the public with the development of alternative energy sources and the implementation of new energy policies.

Robert Fri is a Visiting Scholar and Senior Fellow Emeritus at Resources for the Future, a nonprofit organization that studies natural resource and environmental issues. He served as Director of the National Museum of Natural History, President of Resources for the Future, and Deputy Administrator of both the Environmental Protection Agency and the Energy Research and Development Administration. Fri is a National Associate of the National Academies, where he served as Vice Chair of the Board on Energy and Environmental Systems at the National Research Council, and on several NRC committees, most recently on America's Energy Future and America's Climate Choices. Fri is the chair of a new Academy study examining the Legal, Social, and Economic Considerations of an Alternative Energy Future. He is a Fellow of the American Academy of Arts and Sciences.

Workshop Participants:

Stephen Ansolabehere, *MIT*
Jan Beyea, *Consulting in the Public Interest*
Peter Blair, *National Academy of Sciences*
Ana Unruh Cohen, *House Select Committee on Energy Independence and Global Warming*
Thomas Dietz, *Michigan State University*
Steven Hamburg, *Environmental Defense Fund*
Martha A. Krebs, *California Energy Commission*
Anthony Leiserowitz, *Yale University*
Nathan S. Lewis, *California Institute of Technology*
Michael McElroy, *Harvard University*
Ernest J. Moniz, *MIT*
Roopali Phadke, *Macalester College*
John Rogers, *Union of Concerned Scientists*
David Tilman, *University of Minnesota*
Michael Vandenbergh, *Vanderbilt Law School*

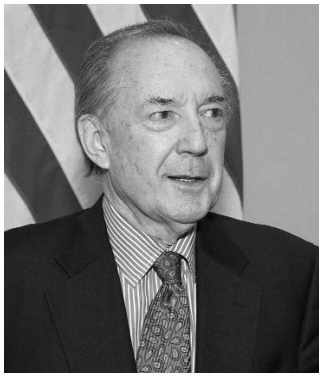
Academy Meetings

Advances in Brain Science: Implications for Therapy

Edward Scolnick and Robert Desimone

Introduction by Emilio Bizzi

The 1955th Stated Meeting, held at the House of the Academy on May 12, 2010



Emilio Bizzi

Emilio Bizzi is Institute Professor and Investigator at the McGovern Institute for Brain Research at the Massachusetts Institute of Technology. He has been a Fellow of the American Academy of Arts and Sciences since 1980. He was the 44th President of the American Academy.

Introduction

When I began working in brain research in the mid- to late 1960s, there were very few techniques available to study the brain. Through the years, I witnessed the progressive increase in new methods and techniques. Truly extraordinary is the progress made in the last fifteen years in molecular biology, genetics, computation, and imaging that has been utilized by brain scientists to understand the functions of the brain and develop new therapeutic approaches to neurological and psychiatric diseases. Tonight's speakers will describe the power, depth, and future of new approaches that have been integrated into the field of neurobiology.

The first speaker, Edward Scolnick, is Director of the Stanley Center for Psychiatric Research at the Broad Institute of MIT and Harvard. Previously, he was President of the Merck Research Laboratory and Executive Vice President for Science and Technology at Merck & Company. At the Broad Institute, his research focuses on identifying genes that are relevant to bipolar disorder and schizophrenia. A distinguished scientist, Ed is known nationally and internationally and has been recognized by the National Academy of Sciences and the American Academy of Arts and Sciences.

Our next speaker is Robert Desimone. He is Director of the McGovern Institute for Brain Research and the Doris and Don Berkey Professor of Neuroscience in the Department of Brain and Cognitive Sciences at MIT. Before joining MIT, Bob was Scientific Director of Intramural Research and Chief of the Laboratory of Neurophysiology at the National Institute of Mental Health.

He has achieved a very important goal in brain science, becoming the first person to identify the neural circuitry that is responsible for the processes we call *attention*. Attention has a primary role in sensory and motor activities and is extremely important for the substrate of learning. Hopefully, this function will be activated in your brain when he speaks.

Bob is a member of the National Academy of Sciences and a Fellow of the American Academy of Arts and Sciences.

Edward Scolnick

Edward Scolnick is Director of the Stanley Center for Psychiatric Research at the Broad Institute of MIT and Harvard. He has been a Fellow of the American Academy of Arts and Sciences since 1993.

Presentation

The goal of the program I oversee at the Broad Institute is to unravel the underlying causes of bipolar disorder and schizophrenia in order to develop better methods of diagnosis and treatment. The Broad Institute, located in the vicinity of the MIT Biology Department, the Brain and Cognitive Sciences Departments (including the McGovern Institute for Brain Research and the Picower Institute for Memory and Learning), and the Massachusetts General Hospital Psychiatry Department, is part of a community of first-rate neuroscientists, geneticists, and chemists – an environment that is necessary to advance our understanding of very complex diseases.

The lifetime prevalence of bipolar disorder and schizophrenia in the general population is approximately 3 percent. Patients face a high risk of suicide and an enormous reduction in life expectancy, even when suicide is not a factor. The afflicted are typically young people just coming into the prime of their lives. Most importantly, because the underlying biology and pathogenesis of these diseases are not understood, patients are diagnosed, still today, simply by the symptoms they describe to their doctors. There is no biological, chemical, or physical quantitative test that helps doctors diagnose either disease. This reality is very unusual for any field of medicine today.

Because we do not understand the diseases' underlying pathogenesis, the drugs used to treat them are only minor modifications of pharmacological agents that existed more than sixty years ago. The field has been in such a difficult situation that, in the past year, three large pharmaceutical companies have shut down their programs for psychiatric research; they simply did not know what to work on.

The single largest reason for failure in pharmaceutical drug research is having to guess at underlying pathophysiology and biochemistry. On the other hand, once these are understood, scientists can usually make a medicine that will help many patients. For example, because of the progress made in the last two or three decades in understanding the molecular biology, genetics, and biochemistry of cancer, an enormous list of drugs – developed within the last fifteen years – has greatly improved the lives of patients with certain cancers. The drugs used to treat some cancers are targeted at the very genetic defect that drives cells to become cancer cells. These treatments are dramatically different from traditional chemotherapy, which was just as empirical thirty years ago as the field of schizophrenia and bipolar disease is today. Thus, developments in cancer treatment are proof that understanding the underlying molecular biology and genetics of a disease can radically improve the outlook for treatment.

Because the underlying biology and pathogenesis of bipolar disorder and schizophrenia are not understood, patients are diagnosed, still today, simply by the symptoms they describe to their doctors.

Currently, the field has one significant clue about the etiology of schizophrenia and bipolar disorder: if you are a patient with one of these illnesses, your first-degree relatives' risk for having the illness increases sevenfold to tenfold (see Figure 1). That is your sibling, your brother or sister, or your parent. So these illnesses run in families.

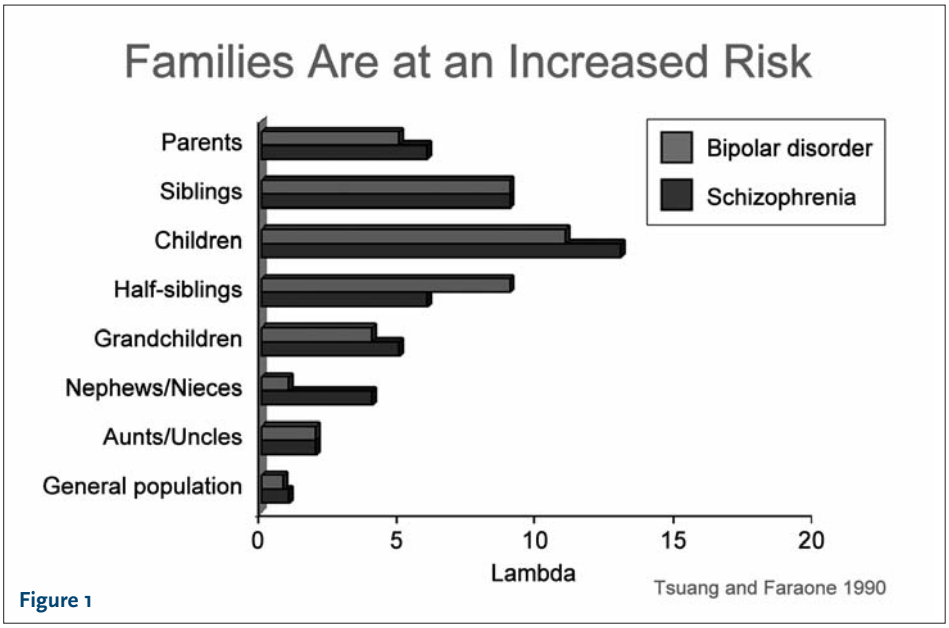


Figure 1

In fact, the single greatest risk factor for developing one of these illnesses is genetic risk. But because these complex diseases are not amenable to methods used to study other genetic diseases, little progress has been made in deciphering the genes that cause them. Recently, however, the study of human genetics pioneered by my colleagues at the Broad Institute – Eric Lander, David Altshuler, Stacey Gabriel, and Mark Daly – and at other research institutes around the world has changed the landscape for studying genetic diseases.

With traditional, or Mendelian, genetic diseases, the disease-causing variance in the genome rarely occurs in the human population but has a very high penetrance when it does occur (meaning that people who have a mutation in a given gene are likely to contract the disease). Roughly two thousand Mendelian diseases have been described in many different fields of biomedicine over the last forty years, as family-based genetic-mapping studies have identified the genes that cause these diseases.

Developments in cancer treatment are proof that understanding the underlying molecular biology and genetics of a disease can radically improve the outlook for treatment.

But many human diseases are not Mendelian in origin. Rather, they are complex human genetic diseases in which multiple genes interact to elevate the risk or actually cause the disease. The methods for studying variances that are not Mendelian – that are risk-associated or causative – for complex genetic diseases have changed dramatically in the last five or six years. This progress began with the sequence of the human genome published in 2001 and was followed by a detailed map of the genome in 2005. Information from human genome sequencing has been used with new technologies to look for common variants that can increase the risk of disease and to find less common variants using DNA sequencing methods. Whereas just two genomes were sequenced in 2001, it is now possible to sequence many genomes. As methods for sequencing advance rapidly while the associated costs fall, a wide spectrum of variants in the DNA that cause complex genetic diseases has become available for investigation. No longer is such research limited to Mendelian diseases. Outside the field of psychiatry, many epidemiological discoveries in these population-based, complex genetic studies have pointed investigators toward positions in the human genome (loci) on different chromosomes that provide clues on where to look for specific disease-causing sequence variants.

There are four particularly spectacular discoveries in human genetics that have significantly changed several fields of medicine in the last two or three years. The first code to be cracked was that of age-related macular degeneration, a common disease caused by a variant in the genes of the complement biochemistry pathway (a system that helps clear pathogens from the body). The second is Crohn's disease, or ulcerative colitis, which is caused by genetic defects in the autophagy pathway (a pathway in the cells that allows cells to engulf and destroy various proteins and microorganisms). These breakthroughs have led to new approaches to treatment that were unknown prior to three years ago.

Third, an amazing discovery made by investigator Stuart Orkin at Children's Hospital Boston has paved the way for new approaches to treating sickle cell hemoglobin, a defect in the sequence of the amino acids that make up hemoglobin, causing it to crumble and sickle under low oxygen conditions. It has long been known that an elevated level of a fetal form of hemoglobin called hemoglobin F (HbF) protects patients from the sickling event. But no one has been able to figure out why certain patients have elevated levels of fetal hemoglobin. Using new methods in human genetics, Orkin discovered a gene called BCL-11 that affects how DNA is made into protein and transcribed. The discovery immediately spawned new approaches to increasing the activity of this protein and, therefore, levels of HbF – a potentially phenomenal new treatment for sickle cell hemoglobin.

As methods for sequencing advance rapidly while the associated costs fall, a wide spectrum of variants in the DNA that cause complex genetic diseases has become available for investigation.

Finally, investigator Sek Kathiresan of Massachusetts General Hospital recently discovered a gene that involves the intracellular degradation of the unwanted form of low-density lipoprotein cholesterol. Again, genetic studies pointed researchers to a particular place on a chromosome and allowed them to unravel the molecular biology.

What has psychiatric research uncovered in the last two or three years? We are beginning to understand some of the underlying genetics of schizophrenia and bipolar disorder. First, scientists have discovered rare structural variations in the genome, or copy number variants, that increase the risk for many diseases. We all carry two copies of our genes, our copy number variant is either less than or more than these two copies. The methods that I outlined above allow geneticists to look for copy number variance in human DNA samples. Large deletions on a number of chromosomes and duplications of other regions of the chromosomes, among other changes, have significant effects. Not only do patients with such deletions or duplications have an increased risk for schizophrenia or bipolar disorder, but they also have many other clinical symptoms of abnormal brain function. (At this point, we do not understand what causes that variability.)

We have also learned that some of these variants are inherited from parents. Sometimes the parents are well even though they carry genetic changes; sometimes they are ill. Some changes are *de novo*: they are dependent on mistakes made in how DNA and cells are reproduced in the formation of an embryo; the changes are at times new to a given person and in some instances inherited from parents. We have discovered a genetic mechanism that accounts for these

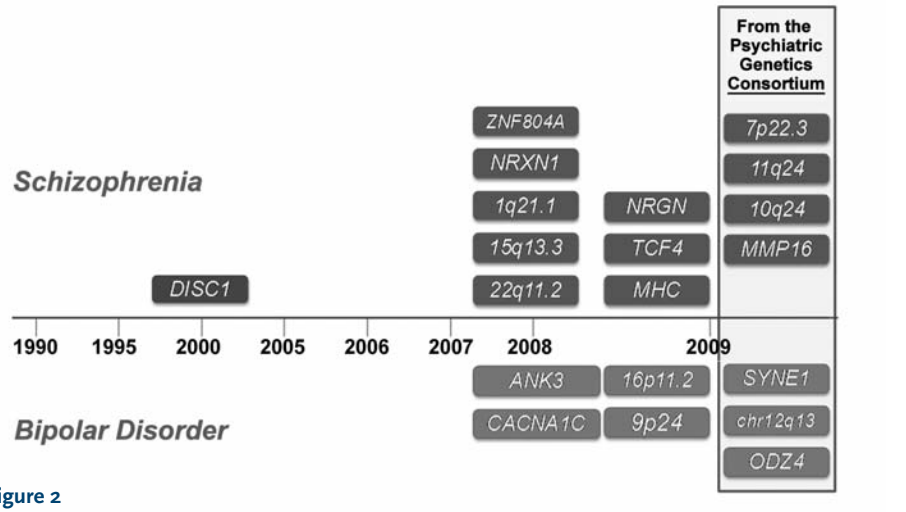


Figure 2

kinds of copy number variants. James Lupski, a geneticist at Baylor College of Medicine, has studied the neurologic diseases Charcot-Marie-Tooth disease and Hereditary Neuropathy with liability to Pressure Palsies, both caused by reciprocal changes in a gene on chromosome 17. Lupski found rare mutations in the gene that occur because anatomical peculiarities predispose this region of the genome to mistakes.

Another insight that has recently emerged involves the chromosomal regions I described earlier and the clinical spectrum of the disease associated with them. In some cases, extra copies of the gene cause schizophrenia; in other cases it causes autism. In some instances, it's the reverse: a loss of copies leads to autism in some and schizophrenia in others. At this point, we can conclude that autism, which affects very young children, and schizophrenia and bipolar disorder, which affect teens and young adults, share some genes as part of their pathogenesis. We do not yet understand this. With detailed DNA sequencing, we hope to begin to sort it out.

In addition, common variants in twelve specific genes or gene regions that confer risk have been found in population-based studies in just the last couple of years (see Figure 2). Using these methods and DNA sequencing, we can begin to unravel the genetic architecture of bipolar disorder and schizophrenia and open up new ways for both treatment and diagnosis.

A recent article in *Science* articulates that we are at an inflection point in this field with the genetic methods available.[1] The policy piece argues for a large-scale approach to genetics to unravel the pathogenesis for the first time in a complete way. Indeed, it is now only a matter of time and money before we have sequenced thousands of samples to decode the underlying biochemistry of these diseases. We can study these complex genetic diseases in model organisms, create models of the human diseases in mice, and even study them in cell culture.

We are beginning to understand some of the underlying genetics of schizophrenia and bipolar disorder. Scientists have discovered rare structural variations in the genome that increase the risk for many diseases.

One illustration of what we hope to accomplish is the recent announcement by a pharmaceutical company that it may have a drug to improve the clinical symptoms of patients with Fragile X Syndrome, a Mendelian genetic brain disease. MIT investigator Mark Bear, a pioneer in the field, has worked out the pathophysiology of that gene's effects, and treatment that was shown to correct the phenotype in mice may have also improved the lives of many patients with Fragile X. This type of breakthrough is the paradigm for what we hope will happen in psychiatric illness.

How are stem cells used to study psychiatric disease in cell culture? Three years ago, a Japanese group headed by Dr. Shinya Yamanaka discovered that human skin cells can be transformed into pluripotent stem cells in culture. Pluripotent stem cells can be programmed to develop into neurons in various parts of the nervous system. Using this technique, we will be able to study the process of neural differentiation in patient samples, knowing the genetic background. As genes are discovered that predispose patients to these illnesses, we will be able to study the pathophysiology and biochemistry that is going wrong not only in animals, or in living brains, but to a degree, in cell culture. We have a comprehensive program in place at the Broad Institute and the Stanley Center for studying patient samples and human genetics. I am not trained as a human geneticist, and I cannot express enough thanks to Eric Lander, David Altshuler, and their colleagues for giving us the opportunity to set up this program.

If you take nothing else from this presentation, I want you to remember that until the last two or three years, gaining a foothold on the pathophysiology of schizophrenia and bipolar disorder was impossible. Now, even though the challenge remains and will still take painstaking work by many scientists, we no longer lack an intellectual approach, something we could never say before.

How long will it take to decipher the full range of genetic causes, understand the neurobiology, and develop treatments? Your guess is as good as mine. But it's now doable; that's what has changed.

[1] Huda Akil, Sydney Brenner, Eric Kandel, Kenneth S. Kendler, Mary-Claire King, Edward Scolnick, James D. Watson, and Huda Y. Zoghbi, "The Future of Psychiatric Research: Genomes and Neural Circuits," *Science* 327 (5973) (March 26, 2010).

Robert Desimone

Robert Desimone is Director of the McGovern Institute for Brain Research and Doris and Don Berkey Professor of Neuroscience at the Massachusetts Institute of Technology. He has been a Fellow of the American Academy of Arts and Sciences since 2001.

Presentation

Understanding the brain is a problem of astronomical proportions. The number of neurons in the brain is approximately equal to the number of stars in the Milky Way. The number of connections between neurons – the synapses – is even larger. (I once read a magazine article in which the author gushed that there are more synapses in the brain than there are atoms in the universe. Somehow I think that isn't quite right, but it *is* a very large number.) In a system this complex, there are many opportunities for error. Beyond schizophrenia, bipolar disorder, and the other psychiatric disorders that Ed mentioned, there are neurodegenerative disorders such as Parkinson's disease, Alzheimer's disease, and autism that have enormous societal and financial impacts. There are no cures, only partial treatments that work in some, but not all, patients. The need for new treatments is enormous.

What, exactly, is taking so long? Even though we are making genetic discoveries in these disorders – from the genes themselves to the proteins that genes create, to the formation of neural circuits, to the thousands of neural circuits in the brain – understanding all these components is a long, arduous task. But it is not my goal tonight to depress you. It is my goal to tell you that, as Ed pointed out, brain research has changed radically in just the last five years. We are the beneficiaries of revolutions in genetics, in systems of neuroscience (understanding how neurons interact with each other in the brain), and in how we understand these large brain systems through the use of brain imaging and intact human subjects. These developments are fundamentally changing how we approach diseases.

Studies of disease models, particularly those in animals, have begun to focus on the neural synapse, where neurons communicate with each other and where much can go wrong. Synapses regulate how different parts of the brain talk to each other. Inside each synapse are many proteins. Studies show that a number of brain disorders seem to involve, at least in part, some of the proteins that make up these synaptic structures. One example of the synapse as a target for neuropsychiatric disorders is the work of Guoping Feng, a scientist at Duke University who will become an associate member of the Broad Institute in Summer 2010. Guoping has been studying two proteins, Shank and SAPAP3, and how they function in synapses.

Even though we are making genetic discoveries in these disorders – from the genes themselves to the proteins that genes create, to the formation of neural circuits, to the thousands of neural circuits in the brain – understanding all these components is a long, arduous task.

Human genetic studies have implicated the SAPAP3 gene in obsessive compulsive disorder (OCD) and the Shank gene in autism. Guoping has created animal models to investigate how these mutations might affect neural circuits and then how they might be treated. For example, he introduced the mutation in the SAPAP3 gene in mice. As a result, the mice groom constantly, a symptom that is reminiscent of the obsessive hand washing sometimes observed in people suffering from obsessive compulsive disorder. Just as in the human disorder, which is treated with antidepressants that have a mild positive effect on OCD, the mice, when given an antidepressant, reduce their obsessive grooming. Even more promising, because Guoping knows the genetic cause of the behavior, he can replace the gene (a type of gene therapy) in exactly the part of the circuit that he has identified as critical for this behavior. Through this genetic rescue, he has in fact largely resolved the behavior, raising the possibility of gene therapy in this disease and pointing us toward targets for drug therapy as well.

Guoping also found that when he studied animals with mutations in the Shank gene, they seemed to have social abnormalities somewhat reminiscent of what we might expect to see in a patient with autism. A normal mouse will gravitate to a new mouse that is placed in its enclosure. Mice with the mutation, by contrast, have no interest in the new mouse nearby. They stay on their own. Guoping is now studying these mice to identify a means of rescuing this kind of phenotype.

Even more surprising is a discovery by neuroscientists Edward Boyden, now at the MIT Media Lab and the McGovern Institute, and Karl Deisseroth of Stanford University that has allowed us to make neurons sensitive to light. They discovered that by taking a light-sensitive protein from an amoeba (the amoeba uses these light-sensitive molecules to steer), packaging it in a virus, and using that virus to infect the neurons in the brain, they could make the brain's neurons become sensitive to light. This finding allowed them to control neural activity with light using a fiber-optic probe to stimulate the neurons. We now have the ability to control many microfibers in the brain, targeting specific cell types, and we are acquiring the ability to play the neurons in the brain the way a pianist would play a piano, which is a tremendous research tool with very important therapeutic implications. It has been used to study obesity and mechanisms underlying sleep, Parkinson's disease, and depres-

sion, but perhaps the most immediate potential therapeutic application is with blindness.

Ed Boyden has collaborated with a group at the University of Southern California, led by neuroscientist Alan Horsager, that has used these light-sensitive molecules to try to cure blindness in mice. They inserted the light-sensitive molecules in the layer of cells in the retina beyond the photoreceptors (see Figure 1), so that other cells in the retina, cells that are not normally sensitive to light but are healthy, become sensitive to light. As an example of some of the early results, when a mouse goes into a water maze, it would normally head toward the lit arm of a maze. But a blind mouse has no idea what to do. When a blind mouse has this light-sensitive molecule put into its retina, it heads for the light. Further testing is needed to determine whether these mice can recognize patterns, among other tasks. But tests done thus far appear extremely promising with regard to therapeutic applications, particularly for diseases such as macular degeneration, retinitis pigmentosa, and diabetic retinopathy, in which the photo receptors degenerate.

Some people have damage to the retina that goes beyond the photoreceptors. We have started to think about communicating information directly into the higher levels of the brain, but because the higher levels of the brain require highly processed information, this effort presents a much more complex problem. We have to understand a lot more about these higher processes to begin thinking about a neuroprosthesis for more complex sensory disorders.

We are the beneficiaries of revolutions in genetics, in systems of neuroscience, and in how we understand these large brain systems through the use of brain imaging and intact human subjects. These developments are fundamentally changing how we approach diseases.

But there are, in fact, other promising applications for neural stimulation. For example, there are applications to relieve depression, to treat Parkinson's disease, to help people with spinal cord damage control their limbs and, potentially, to help people who have lost arms and legs control robotic limbs (a significant problem for injured soldiers returning from Iraq).

Interacting with the brain at these higher levels requires better neural models for higher brain function. Fortunately, there has been recent progress in this endeavor. For example, investigator Tomaso Poggio (of the McGovern Institute and the Brain and Cognitive Sciences Department at MIT) and his colleagues have used computer algorithms to model how the brain processes visual information and recognizes complex objects. These computer algorithms recognize objects with performance similar to people recognizing objects under the same conditions.

I want to switch from animals and computers and talk about work in human beings, namely brain imaging. Scientists experimenting with brain imaging are beginning to capitalize on the knowledge acquired in genetic experiments. Investigator John Gabrieli, of the McGovern Institute and the Brain and Cognitive Sciences Department at MIT, has studied brain activation in people placed in a brain scanner and instructed to do nothing. What do people do when they're asked to do nothing? They think; they self-reflect. John and others have found that such activity in the brain is not random. Rather, there is a characteristic pattern of activity in certain brain structures that communicate with each other, and that activity can be mapped (see Figure 2). In patients with schizophrenia, brain imaging reveals that a similar system is activated, but the activity is expanded. The implication is that this increased activity is related to the over-thinking and self-rumination that occurs in the schizophrenic subject. The application for genetics is the finding that scans of the first-degree relatives of patients with schizophrenia show an intermediate pattern of brain activity. These relatives share some genes with their schizophrenic relatives, which gives us some hope that we will be able to identify the specific brain systems that are influenced by specific genetic variations. Now that we have begun to identify specific disease genes in psychiatric populations, we

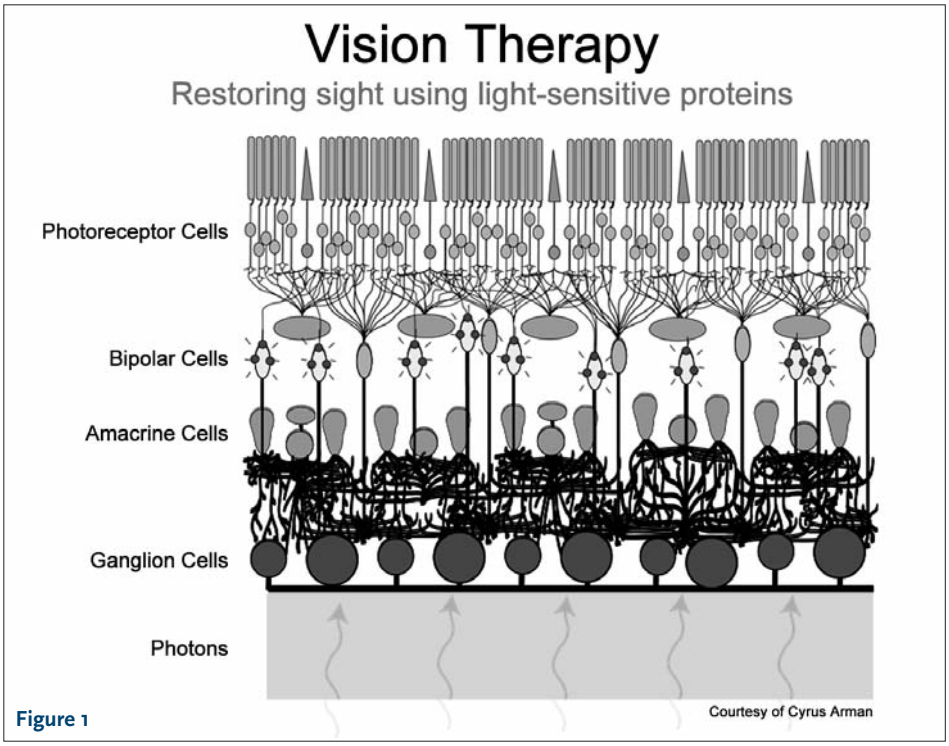


Figure 1

Figure 2

can advance efforts to pinpoint the specific neural circuits that are influenced by mutated genes in these populations.

MRI technology can be used not only as a diagnostic tool but also as a kind of therapy itself. Patients use feedback from their own brain imaging patterns to learn to control the activity in their brains. The basic idea is to place subjects in the scanner, measure their brain activity, and (now that computer systems are fast enough) extract this information in real time. It can be used to create what is called a flame representation of the amount of activity in some patients' brain structures. As the flame increases, the activity there increases; as the flame dies down, the activity decreases. Patients in the scanner are instructed, basically, to try to make the flame go higher. Over time, patients learn to do this. They don't know how they do it or what they're doing, but they learn to do it. We know that in some brain disorders, people have altered patterns of activity in the brain. The question is, can they learn to renormalize their own brain activity patterns through training?

The first application of this retraining technique was in people suffering from chronic pain. In these subjects, there is abnormal activity in the anterior cingulate cortex. Patients underwent training sessions in which they learned to adjust the activity in their own anterior cingulate cortex. Most important, in the post-test run, they do not receive any feedback but have learned, over days or weeks, to control the activity in this part of the brain. Tests have shown that pain perception in these patients changes over time, so they are learning to control their own perception of pain. The $64 million question is, can this approach be applied in other disorders, such as depression, or cognitive disorders? In a pilot study at MIT, subjects are learning to control the activity in one of the reward centers of the brain, the nucleus accumbens. Activity in that center is known to be low when regulated in people suffering from depression.

We now have the ability to control many microfibers in the brain, targeting specific cell types, and we are acquiring the ability to play the neurons in the brain the way a pianist would play a piano, which is a tremendous research tool with very important therapeutic implications.

Now that we know that people who do not have depression can regulate the activity in their nucleus accumbens through this feedback, the question is whether people suffering from depression could learn to elevate their mood by controlling their own brain activity. The best outcome would be an approach that allows patients to be their own therapist and, potentially, independent from drugs.

Everything that I have discussed has required collaboration across disciplines and institutions. Indeed, the science of the future depends on breaking down the silos and on people working together. A physical example of this metaphor is the former grain silos of the Quaker Oats Company in Akron, Ohio, where the company used to store their grains. Of course, it is no longer necessary to have silos in the middle of a city, and so they have broken through the silos and turned them into a hotel and conference center. Thus, this structure has evolved to keep pace with modern times, just as science is evolving to keep pace with changing times in which we all are becoming more interactive.

Question

I noticed that Dr. Scolnick broke down the cancers into different types. Is the same required for schizophrenia and bipolar disorder? It seems that progress is slow because you are treating schizophrenia as if you were trying to treat all cancers with one drug.

Edward Scolnick

The way to break down these psychiatric disorders is to break them down genetically. Genetic categories that cause different types of schizophrenia will eventually be identified. It is very clear that they are heterogeneous categories, as your question implies. In other words, there is a spectrum with classical schizophrenia on one end, classical bipolar disorder on the other, and every variation imaginable in the middle. Eventually, there will be genetic categories and then additional biomarkers to go with those genetic categories.

Question

Does theory have a significant role in brain science? Given that the instruments available from mathematics and physics concern such complexities, has there been any transfer of those instruments into your field?

Robert Desimone

Tomaso Poggio is a good example of a scientist trained as a physicist who has now turned his attention to brain problems. I would invite him to share his thoughts on that issue.

Tomaso Poggio

There have been attempts to develop theories at the several different levels that are needed to fully understand the brain, some quite successful and some less so. For instance, the Hodgkin-Huxley model describes spike production and propagation in neurons and axons – in other words, how electric signals are generated and transmitted. This is a theory that, once supported by experiments, became a milestone in neurobiology. At a higher "computational" level, it is important to understand how the brain solves problems such as perception, language, and reasoning: in other words, how the brain produces intelligence. At this level, we are starting to make progress but we have not managed yet to program computers to behave or think at the same level as our brains do. Understanding intelligence and how to reproduce it in machines is, I think, the most difficult problem in science; we will get there, but it will take some time. I also think neuroscience will inform computer science and not the other way around, as people predicted a few decades ago.

Emilio Bizzi

Why do patients with schizophrenia express the disease in their late teens?

Edward Scolnick

Today, that question is unanswerable. Scientists speculate that a pruning of synapses occurs during the late teens or early adult years that somehow tips the balance. There are clear endocrine changes that occur at that time. As we learn more about the genes, we hope to begin to formulate an answer.

Question

How do you treat a genetic disease like autism if it exists from birth but is not expressed until the child is already two or three years old?

Edward Scolnick

I think the recent progress in treating Fragile X syndrome, which I mentioned briefly, illustrates the treatment paradigm that we hope to coordinate for diseases like autism. Fragile X is a Mendelian disease, which means that it is caused by a mutation in a certain gene that, in effect, silences that gene. The mutation is present from the beginning of the baby's life. In tests with mice, it is present throughout the mouse's development from baby to adult. Afflicted children and mice have a variety of behavioral abnormalities because of malfunctioning synapses. In other words, the connections are there but are not working properly because the protein is not functioning. Even

Genetics has changed many fields of medicine, with new methods of diagnosis and treatment.

though the problem is developmental, it can be partially corrected, at least in mice, and perhaps now in humans. The brain is very plastic. Once we understand the cause of malfunctioning and can identify the pathways, it will be possible to look for ways to correct the functioning. If the circuits are constructed abnormally, however, and are themselves connected to wrong places, the problem will be much more complicated. But if the circuits are connected properly, I think there will be a way to correct the functioning.

Robert Desimone

A recent study that followed children diagnosed with autism reported that roughly one-third of kids with an early diagnosis of autism improved to the point that they no longer have an autism diagnosis. As Ed mentioned, the brain is very plastic and receptive to change and perhaps even educational approaches, whatever the problem. So there's certainly hope that even the older kids will be helped.

Emilio Bizzi

Recently, the cells in the pancreas that do not normally produce insulin have been changed into insulin-producing cells with the insertion of three genes. This, to me, is a fantastic discovery. Do you see potential for that approach in the field of brain science?

Edward Scolnick

Though conceivable, transdifferentiation would be difficult to achieve in the brain. But as Bob pointed out, the related ability to study and manipulate circuits is important.

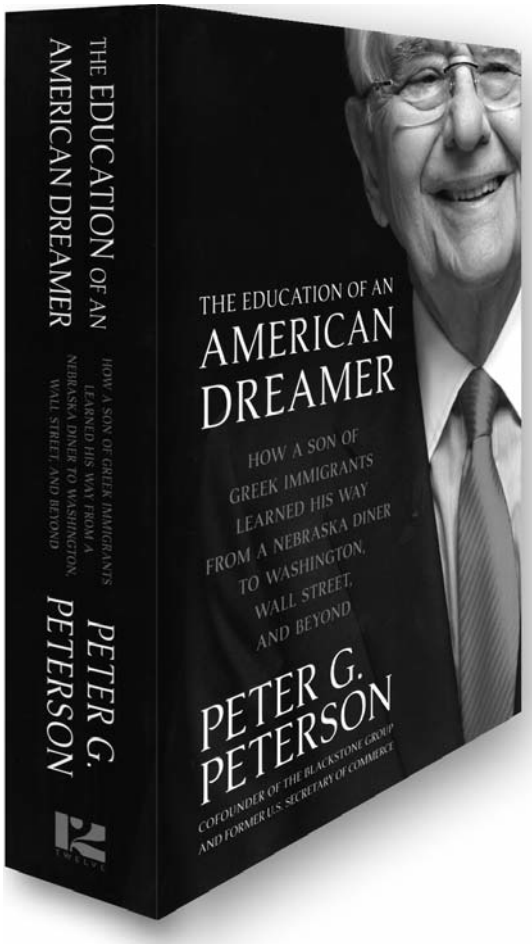
Question

It sounds as though the psychiatric profession is going to be profoundly challenged by these discoveries, more so perhaps than we might imagine any other medical subspecialty being abruptly challenged by scientific discoveries. What are your thoughts on that issue?

Edward Scolnick

I agree that in psychiatry, and certainly in psychiatry departments at research institutes, methods for diagnosis and treatment will change dramatically. Professional training programs will change as well.

Broadly speaking, the biologic driving force for biological science has been genetics, enormously enabled by physics, chemistry, engineering, and computer science, but the intellectual driving force has been genetics. Genetics has changed many fields of medicine, with new methods of diagnosis and treatment. I predict similar changes occurring in psychiatry within the next five to ten years. Psychiatry departments in medical schools should start thinking now about how they plan to adapt their educational programs. ■



The Education of an American Dreamer

Peter G. Peterson

Introduction by Peter Nicholas

The 1948th Stated Meeting, held at the House of the Academy on November 11, 2009

Peter Nicholas

Peter Nicholas, a member of the Academy Trust, is Co-Founder and Chairman of the Board of Boston Scientific Corporation. He has been a Fellow of the American Academy of Arts and Sciences since 1999.

Introduction

Pete Peterson's story, which resonates in many ways with my own family's experience, is a classic rags-to-riches saga. He has fully lived the American dream, a fact he acknowledges in the title of his wonderful new memoir, *The Education of an American Dreamer*.

The subtitle of Pete's book, *How a Son of Greek Immigrants Learned His Way from a Nebraska Diner to Washington, Wall Street, and Beyond*, hints at the path he's taken in realizing that dream. Pete's father arrived penniless in America at age seventeen and somehow ended up in Kearney, Nebraska, in the central part of a state that's in the center of this great country. After changing his name from Georgios Petropoulos to George Peterson, Pete's dad opened and ran a diner for twenty-five years. The diner was open twenty-four hours a day, or 24/7 as they say these days. Young Pete was pretty good at math and was allowed and encouraged to man the cash register from a young age.

After graduating from Northwestern University, Pete began a career that led from market research to advertising to business. He joined the Bell and Howell Corporation in 1958 and became Chairman and CEO of that company at the young age of thirty-six. In 1971 two fellow Academy members, Douglas Dillon and George Shultz, recruited Pete to Washington to serve in the Nixon White House, first as Special Advisor for International Economic Policy and later as the nation's twentieth Secretary of Commerce. *Time* magazine referred to Pete as the most powerful Secretary of Commerce since Herbert Hoover. Pete then moved to Wall Street, where he served as Chairman and CEO of Lehman Brothers

from 1973 to 1977 and of Lehman Brothers, Kuhn, Loeb from 1977 to 1984. He left to co-found the Blackstone Group, a private equity and investment management firm in New York City. In 2008 he retired from Blackstone after twenty-three years with the company.

Pete is a tireless multitasker who has contributed his wisdom and leadership skills to numerous other careers outside the business world. He is Chairman Emeritus of the Council on Foreign Relations and the Founding Chair of the Peterson Institute for International Economics in Washington, D.C., renamed in his honor in 2006. He was Chairman of the Federal Reserve Bank of New York, the Founding President of the Concord Coalition, a member of President Clinton's Bipartisan Commission on Entitlement and Tax Reform, and Cochair of the Conference Board Commission on Public Trust and Private Enterprise.

His new memoir is the latest of several books he has authored over the years that talk about how to fix what he sees as fundamental problems in this country. They include *Running On Empty: How the Democratic and Republican Parties Are Bankrupting Our Future and What Americans Can Do About It* (2004), *Gray Dawn: How the Coming Age Wave Will Transform America – and the World* (1999), *Will America Grow Up Before It Grows Old?: How the Coming Social Security Crisis Threatens You, Your Family, and Your Country* (1996), and *Facing Up: How to Rescue the Economy from Crushing Debt and Restore the American Dream* (1993). Pete's most recent project is the Peter G. Peterson Foundation, which he launched last year and endowed with a personal commitment of $1 billion of his own funds, which represents a substantial portion of Pete's net worth. The Foundation focuses on what Pete has called "the undeniable, unsustainable, politically untouchable threats to this nation's future."

The Academy was proud to elect Pete as a Fellow in 2006.

Peter G. Peterson

Peter G. Peterson is Co-Founder and Chairman Emeritus of The Blackstone Group and Founder and Chairman of the Peter G. Peterson Foundation. He was elected to the American Academy of Arts and Sciences in 2006.

Opening Remarks

If you are presumptuous enough to write a book as a businessman, you have to be prepared to get roasted, and my favorite roaster is Ted Sorensen, President Kennedy's assistant. Of one of my earlier books he said, "This is a book that once you put it down you will not be able to pick it up." Of my last book he said, "We're here to anoint Peterson into literary sainthood. When I think of him, I think of Saint Paul, the dullest town in America." He renamed my *Gray Dawn* "Gray Yawn." So beware if you are a businessperson writing books.

I am an American dreamer. Because I am an American dreamer, I am concerned that the American dream may not be there for the generation of my five kids and nine grandchildren. This is the first time in history that a majority of Americans do not believe their children will do better than they did. If they are correct, it will change this country at its core.

This is not going to be an inspirational, charismatic speech, and for two reasons. First, I have negative charisma. Second, I am a great believer in the concept that an informed democracy is the best democracy. But Americans have been misinformed by politicians who believe that the American people cannot take the plain, hard truth. Our politicians also believe that asking us to make sacrifices is not only politically incorrect but politically terminal to their careers. I do not accept these basic notions.

When I set up the Peter G. Peterson Foundation, many of my friends asked, "What makes you think you can make a difference?"

I don't *know* if we can make a difference. No doubt many will say I'm presumptuous to assume that we can effectively tackle some of the basic challenges facing this country, but I *believe* we can make a difference.

I was presumably educated at the University of Chicago, where a great Nobel Prize winner once said something that has stuck with me. He said, "If you have no alternative, you have no problem." Thinking about that and about how I would feel on my deathbed if I had not tried to do anything, despite feeling deeply that this country was challenged at its very core, I concluded that that was no alternative at all.

This is the first time in history that a majority of Americans do not believe their children will do better than they did. If they are correct, it will change this country at its core and what America has been all about.

Something else played a role in my billion-dollar decision. The billion dollars came about from a very surprising windfall when the firm I co-founded went public. The story goes that Kurt Vonnegut and Joseph Heller were at a palatial mansion of a hedge fund operator in the Hamptons when Vonnegut looks at Heller and says, "Joe, doesn't it bother you that this guy makes more money in a day than you made selling *Catch-22* all over the world?" Heller replies, "No, because I've got something this guy doesn't have." Vonnegut looks at him and says, "Joe, what could you possibly have that this guy doesn't have?" Heller answers, "I know the

meaning of enough." I thought about that, knowing I had more than enough, and the decision to start the foundation wasn't really a very difficult decision.

When I was in the Nixon White House, we had a Nixon humorist there. To Democrats the idea of a Nixon humorist might seem like an oxymoron, but Herb Stein really was a funny man. One day he said, "If something cannot go on forever, it will stop." Then he said, "If you don't like that one, there's always the old saying, 'If your horse dies, we suggest you dismount.'" Well, we're behaving as though we can ride this horse we're on indefinitely.

The Peterson Foundation has picked three challenges that are currently unsustainable in my opinion: entitlements (Social Security and Medicare); current account balance of payments and savings deficits, and the foreign borrowing that sustains us; and healthcare costs, about which much is being said and little is being done.

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On entitlements, you hear a lot about the $11 trillion public debt. What you do not hear about are the *un*funded promises and liabilities that are much larger. Social Security's liability is $7 trillion. Medicare's is $34 trillion. Our total liabilities are $56 trillion in today's dollars. That's a mind-boggling number: $485,000 of hidden debt per American household; four times the size of the U.S. economy; more than the net worth of all households in America. In other words, we owe more money than we own. To meet these obligations with taxes, payroll taxes would have to double. I would call that gross taxation without representation. Many people say, let's just get rid of those damn Bush tax cuts; that will take care of the entitlement problems. Well, the Bush tax cuts amount to 1 percent of the gross domestic product of this country. Entitlement spending increases are 9 percent, or nine times more than the entire Bush tax cut package.

Now, some who believe in the supply side say we can grow out of these obligations, so relax and enjoy. I asked some experts to compute how fast we would have to grow in real terms in order to meet these obligations through growth alone. Turns out, we would have to grow in double digits, or four to six times as fast as we have ever grown in history.

Some politicians ask ,what are you concerned about? The Social Security trust fund will remain solvent for another forty to fifty years, so relax and enjoy it. I have been collecting oxymorons ever since *Time* magazine referred to me as the most powerful Secretary of Commerce since Herbert Hoover. There has never been a powerful Secretary of Commerce. And the Social Security trust fund, I'm sorry to say, is an oxymoron: it should not be trusted, and it's not funded. The fund contains nothing but liabilities and promises that we can't afford.

Even if we got rid of the Bush tax cuts, got rid of earmarks, and ended the wars in Iraq and Afghanistan, we would be able to take care of only 15 percent of the fund's obligations.

The second great unsustainable challenge the Peterson Foundation is focusing on is our current account balance of payment and savings deficits. Because we consume far more than we produce in America *and* because we save so little, we are in the position of having to borrow money from foreign sources. I asked the Peterson Institute for International Economics if they would create a series of scenarios for what our foreign debt will look like if we persist on our current path. If I wanted to give you a serious systemic digestive problem, I would share the Institute's numbers. Instead I'll quote one sentence from their report: "The projected path is so unsustainable and dangerous that a crisis would virtually be certain to occur long before the U.S. reached such a painful point of reckoning."

One of the great challenges we face is the enormous quantity of the financing that will be required by the debts and deficits we are building and where we would get that money.

One of the great challenges we face is the quantity of the financing that will be required by the debts and deficits we are building and where we would get that money. The *National Journal* recently indicated that most experts' estimates are, if anything, underestimates: "Even alarmists may be underestimating the size of the debt problem and how quickly it will become unbearable." Paul Volcker, former Chairman of the Federal Reserve, believes the odds are 75 percent that we will see a dollar crisis within five years if we don't change our ways. He describes such a crisis as a hard landing: the dollar falls suddenly and sharply, and interest rates rise steeply, producing both high inflation and low growth. If we had more savings both at the national and personal level, our country would not be as exposed to these major risks. We used to be one of the biggest savers in the world, but in recent years our personal savings rate has plummeted. If we are going to rescue our economic future, we simply must save more.

Finally, no serious discussion of unsustainable challenges can omit consideration of health-care costs. Much is being said about health care these days, including that the reforms working their way through Congress will be deficit neutral. Even if the new programs are deficit neutral, they will do nothing about the underlying longer-term problem of Medicare's $38 trillion in unfunded promises and liabilities. We spend twice as much per capita on health care as the rest of the developed world, and by many criteria our health outcomes are not as good. We are racing toward a day relatively soon when health care will consume 20 percent of the GDP, threatening the very

competitiveness of our economy. In the current debate on health-care reform, lowering health-care costs has been cited as a prime objective, but as I analyze the proposed legislation, I see little that does anything about the major causes of America's health-care cost crisis.

In a recent column that I wrote for the *Financial Times*, I pointed out ten health-care cost drivers that are being ignored. One is the utterly perverse payment system in Medicare called "Fee for Service." We pay for the procedures, we pay for the visits, we pay for the tests, and we pay for the surgery. Consumers have no stake at all – as far as they are concerned, it is free. The effect is what you might expect. If the providers have an incentive to do more and the consumer does not care about the costs, the result is a huge increase in the number of procedures. As a result, on a per capita basis we perform five times the number of CT scans as Germany. We perform five times as many coronary bypasses as France. Until we reform fee for service, we won't be attacking one of the great cost drivers in health care.

The Social Security trust fund, I'm sorry to say, is an oxymoron: it should not be trusted, and it's not funded. The fund contains nothing but liabilities and promises that we can't afford.

Another major cost driver is the great variation in levels of treatment and costs from one geographic area to another. For example, in some states or regions in America six times more back operations and six times more prostate removals are performed than in other areas. I know we have "red" states and "blue" states, but am I to believe we have "bad prostate" states and "bad back" states? It's ridiculous. And yet we tolerate these enormous differences in costs.

We are the only developed country in the world that has an open-ended cost-plus budget. Most of us have learned to live with budgets. They force us to make choices. But because the federal government has no priorities for its budget, entitlements such as Medicare costs have exploded in recent years. This impacts our ability to fund core research, to make the necessary investments in our future. Forty to fifty years ago the government routinely spent 5 percent of its budget on research and development. Out of that research came the Internet, to take just one example. Today we spend less than 2 percent of the budget.

Roughly 30 percent of Medicare costs are associated with the last year of life. This is obviously a highly complex issue, but we have to face the fact that we spend significantly more than the rest of the world on heroic intervention in the last months of life. We must begin to confront the profound, difficult questions attached to this issue. Is the government obliged to prolong life indefinitely, or is its obligation only to prolong life as long as a reasonable quality of life can be maintained? Should the government be responsible for costly heroic interventions, or should these be the responsibility of the individual taxpayer? These issues are difficult, but if we start thinking about them we can perhaps realize outcomes similar to La Crosse, Wisconsin, where 96 percent of residents have signed an advance directive for end-of-life care. As a result, their end-of-life medical costs are 20 percent below the national average.

So much for the three challenges the Peterson Foundation is focusing on. What do we do about them? First, each of the challenges has many dimensions. We can't run away from the fact that all of the choices will be difficult and will often require us to make some shared sacrifice. The good news is that many sensible and workable proposals will also protect the truly needy. So the difficulty isn't so much with the proposals as with the lack of political will to do something. The good news here is that the public today is far more aware of and concerned about our fiscal future than at any time I can recall in the last twenty-five years.

Several ingredients will be required if we are going to come up with an answer. Presidential leadership is essential. So is bipartisanship. I was brought up in Nebraska, and

Because we consume far more than we produce in America and because we save so little, we are in the position of having to borrow unprecedented amounts of money from foreign sources.

we used to hunt for pheasants and turkeys, which leads me to talk about the "turkey shoot phenomenon." The poor turkey that lifts its head gets it shot off. Likewise for the politician who mentions reform and does so alone, whether of Social Security, Medicare, or most anything else. For reform to be successful, it must be bipartisan.

The Peterson Foundation is working to educate, motivate, and activate the American people to do something about these problems. Blaming the politicians is easy, but everyday citizens share a measure of the blame, too. The Founders expected that members of Congress would not have to give up their careers because they would go to Washington only for brief periods during the year and they would be there only for a limited number of years until they had achieved some particular objectives. Today most of our elected representatives view being an elected representative as their career, so their focus is not on the next generation but on the next election. Ultimately, we the people have to make it safer for politicians to do the right things. If you look at the political landscape, you see that the future in general and the youth in particular are not represented. We need a new special interest group in Washington, one that represents the future, the interest of our kids and our grandkids.

America in times past has been remarkably resilient. After World War II, our public debt stood at 110 percent of GDP – much higher than it is now. But in a period of about thirty to forty years, the Greatest Generation paid down that debt to about 30 percent of the GDP while also paying for the GI Bill, the largest infrastructure program in American history, and the Mar-

shall Plan. So we have done it before, and there's no reason we can't do it again.

The question before us is, will it take a crisis to get us to act? If we do require a crisis, its costs will be immense and could easily arise in the foreign exchange markets as foreigners lose confidence in our ability to manage our fiscal affairs and refuse to lend us money except at very high interest rates. Avoiding a crisis is one of the main focuses of the Peterson Foundation.

An important part of our effort will be directed at young people. You might remember the old philosophy class joke where the professor says to the kids, "Which is worse, ignorance or apathy?" And some sleepy kid from the back of the class says, "I don't know, and I don't care." Well, we have to make today's young people care and make them aware. To do so, the Peterson Foundation is going to mount a major digital media effort. We are already on MTV in a major way, and we are developing video games and other digital initiatives.

We used to be one of the biggest savers in the world, but in recent years our personal savings rate has plummeted. If we are going to rescue our economic future, we simply must save more.

I have a dream that we will be able to create an organization to represent the interests of the young in the way that the AARP represents the interests of the elderly. We might call it the AAYP, the American Association of Young People. The AARP is thirty-nine million members strong, and its members vote a lot, lobby a lot, call their congresspeople a lot, and generally use every legitimate weapon available to promote their interests. What they are interested in can usually be described in three words, "I want more." We need a movement in this country of people who understand that we are going to have to get by with less in the public arena. Perhaps some day we'll see one hundred thousand young people march on Washington, chanting in the spirit of *Network*'s Howard Beale, "I'm as mad as hell, and I'm not going to take this any more."

The German theologian Dietrich Bonhoeffer once said the ultimate test of a moral society is the kind of world it leaves to its children. I say to all of us that we have to get off of our butts and make it safer for politicians to make the tough choices, to do the right thing, and less safe for them to continue to do nothing but slip the bills to our kids. Do we have any alternative but to try?

Reflecting on Prospects for America: A Conversation between Peter Nicholas and Peter Peterson

Nicholas: One of the most compelling aspects of your recent memoir is the remarkable journey you have been on and where it all started and how it came about. What were the particular ingredients of your success?

Peterson: I could ask you the same thing! Well, to start, I chose very good parents. And in my father I had a role model who made two great impressions on me. One was to develop a work ethic, a lesson that at times in my life I have carried too far. The other was to invest in the future. My father used to save large amounts of whatever he made, and he would send it back to the old country to help build roads and other things in the communities of his parents and grandparents. I have learned the ethic of saving, of thinking about and investing in the future. My father also taught me hard lessons. He kept a car longer than anybody I have ever known in my life, maybe fifteen, twenty years. So, if I needed a new bicycle, he would say the one you already have will do for another two years. In that way he taught me thrift, which was just as important as the work ethic and investing in the future.

Nicholas: Your books often talk about threats from within. Today you focused on the enormous consequences of America's unfunded debt and deficit spending and the reckless behavior and inability of politicians to do the right thing. But you have long been involved with the international community around a whole range of issues, including arms control, Russia, and international economics. What are your thoughts on the threats that come from outside the country?

We spend twice as much per capita on health care as the rest of the developed world, and by many criteria our health outcomes are not as good.

Peterson: When I'm concerned about foreign debt, I'm not only concerned about the impact on our economy. But our debt has major geopolitical implications as well. In the 1950s the British made a big move on the Suez Canal and sent some troops there. This was very much against U.S. policy. At the time, we owned a large portion of British securities. President Eisenhower told his colleagues, "Get a hold of our British friends and just tell them 'our enthusiasm for what you're doing is very restrained, and if you don't get your troops out of there right away, we'll have no alternative but to dump your British pound securities.'" The Brits left in ten days. There's no reason that the Chinese, who are now the biggest foreign owner of the U.S. Treasury, can't decide for political reasons, and perhaps to some extent for economic reasons, to cut back their lending to us.

I was privileged to be in charge of the economic negotiations with the Soviet Union in 1972. At the time, everybody was telling me what a superpower they were, but I decided to do my own analysis of the situation. I had the CIA put together a large number of statistics, and a fascinating pattern emerged. Although at the time we called the Soviet Union an economic superpower, out of thirty-four categories of products we examined, in only one could they export to anybody other their buddies in Eastern Europe. They were totally uncompetitive.

During one of my trips to the Soviet Union I was in the southern part of the country to see Leonid Brezhnev. One of the first things he wanted to do was to show me his Olym-

pic-size indoor-outdoor swimming pool. The pool was an extravagant structure with automatic glass doors that opened and closed so that Brezhnev could use the pool whenever he wished. Having heard much talk from the Communists about how their people were all equal, I was tempted to ask whether Olympic-size indoor-outdoor swimming pools were a standard piece of merchandise that everyone in Russia owned.

In reality, their economy was decrepit, a fact that was evident everywhere. I visited a photo shop that was selling cameras that had been dropped from American stores four years earlier. And as I was being driven to Brezhnev's villa, I noticed a lot of farm equipment standing idle. Before embarking on this trip I had been impressed with the fact that although the Soviets were spending more on farm equipment than we were, their productivity was only 9 percent of ours.

So, during dinner, I asked the minister next to whom I was sitting to explain why so much of the farming equipment sits idle. He replied, "I've been to Iowa, and your situation is very different than ours. In Iowa the farmers own the land and the equipment, so it is their property and their business. Here the farmers own nothing. There, if the farmers sell their goods at a good price, they keep the revenues. Here, they keep nothing."

Wherever I looked in the Soviet Union, I saw an obsolete central planning system that couldn't possibly compete in the modern world economy. And sure enough, twenty years later that had become very evident.

Nicholas: Although Russia may not have had much to sell then, some people argue that today they are getting their arms around 70-plus percent of the world's oil and gas supply by virtue of hegemony in their part of the world. This, people say, is one of the reasons the Russians don't support our interests in Iran. At the same time, we Americans don't seem to be able to develop and articulate an energy policy. How is the public to think about this? And what needs to happen to resolve this issue before the fears of many people are in fact realized?

Peterson: We have created a political system that's all about "I want it now, and I don't want to pay for it," where shared sacrifice is considered politically terminal. Our energy consumption per capita is much higher than in the rest of the world. One of the obvious changes that should be considered is a gasoline tax that would be refunded against other taxes. In Europe the average gasoline tax is now close to $4 per gallon. The average in the United States is 47 cents. Somehow people have to be persuaded that reducing consumption is a must. The beauty of attacking the consumption problem is that it can be attacked much sooner and at lower cost than developing wind farms, solar systems, and so forth. However, the effort to reduce consumption ultimately must be combined with a major effort on alternative energy sources.

We are racing toward a day relatively soon when health care will consume 20 percent of the GDP, threatening the very competitiveness of our economy.

Nicholas: Many people look to Wall Street as being responsible for much of our recent financial crisis. Do you think our recent experience has been a sufficient wake-up call to produce the kind of changes, regulatory and otherwise, that might prevent such crises from happening again? And, perhaps more important, how can business become a part of the solution, not the problem?

Peterson: Not long ago, Tom Friedman, writing in *The New York Times*, argued that today's business leaders are MIA, missing in action. This reminded me of the fact that in the immediate post–World War II period, a band of six senior corporate officers from major U.S. companies got together and decided that the long-term interests of our country would best be served if we poured massive amounts of aid into helping Europe and Japan reconstruct from the devastation of the war. They reasoned that if Europe and Japan – Europe, in particular – were leveled to the ground, U.S. businesses wouldn't have markets. Their idea led to the Marshall Plan, which the American people originally wanted nothing to do with. They wanted to come home. They were tired of costly foreign adventures. And so, at first, only 14 percent of Americans approved of the Marshall Plan. A huge movement was mounted to make the American people aware of why it was in their interest to have a Europe that was economically sound.

I'm not aware of any important, sustained effort by today's business community to talk and do something about the unsustainable problems facing this country, and yet the business community's health is closely related to our long-term economic health. So I recently wrote a piece about this for *Business Week* that won't endear me to most business executives, because I think Friedman is correct. We are missing in action.

On the need for regulation: I haven't seen details but the proposed financial reform legislation sounds like a comprehensive program of regulation. We seem to have learned our lesson on that score. Even Alan Greenspan has acknowledged that people don't always act in their enlightened self-interest. In some cases they don't know what their enlightened interest is.

The compensation system on Wall Street, and to some extent in corporate life in general, violated certain principles, one of which was not identifying closely enough with the stockholder. To address this, I would heavily base compensation on long-term performance and pay top executives more in stock. I would insist that this stock be held a substantial period of time. Prior to the financial crisis traders were trading trillions of dollars of derivatives and credit default swaps, marketing them at unrealistic values (because no one knew how to value them), and then taking huge bonuses, tens of millions of dollars, only to discover three years later that what they had been trading was far from being profitable. That's why we have to move to compensating for long-term performance and in stock. ■

Black Humor: Reflections on an American Tradition

Gerald Early, Glenda Carpio, and Werner Sollors

The 1949th Stated Meeting, held in collaboration with the Chicago Humanities Festival on November 14, 2009, at Northwestern University School of Law

The five illustrations were drawn by Academy Fellow and novelist Charles Johnson.

A Brief History of African American Humor

Gerald Early

Gerald Early is Director of the Center for the Humanities and Merle Kling Professor of Modern Letters at Washington University in St. Louis. He has been a Fellow of the American Academy of Arts and Sciences since 1997.

The assistant director at the humanities center I supervise is a Chinese woman who used to be a practicing archaeologist. She grew up in Beijing during the Cultural Revolution, lived in Tibet for five years, and did not come to the United States until the 1980s. Despite being an American citizen, she still deeply identifies with China. Once she wanted to prove a point to me about the cultural nature of humor, so she translated for me a popular urban Chinese joke. She thought it was hilarious. Not only did I not get it, it seemed incomprehensible to me. It was not only not funny, it was nonsensical. That was the point she was trying to prove: in our global world, humor is something that does not translate well. "Every group has its humor," she said, "and understanding that humor determines whether you are an insider or an outsider. In America, there are a lot of different groups with insider humor. Can you understand how another group laughs at itself? And why?" I thought her observation was incisive. In the United States, with its many different groups, humor *is* the insider's marker. Humor is an important creative act that binds a group together, gives it an identity, and defines its view of itself and the world outside itself. In the United States, a country that seems at times confused or unsure about assimilation versus pluralism, group humor is complex in its function and meaning. To understand how a group constructs itself through humor is not easy. A group's humor might contain elements of self-hatred as well as elements of self-protection. How can an outsider understand all or any of this if people in the group do not themselves fully understand the complexity of their humor and, as might be the case with many in the group, do not like the humor of their group?

Much commentary has been written about racial humor in the United States. And why not? It is a rich subject with a history dating back to the days of nineteenth-century minstrelsy, which gave us a complex intergroup humor of white performers pretending to be comically stereotyped versions of blacks. When, after the Civil War, this form of entertainment finally permitted black performers, they, too, had to act in the traditions of the art, playing comically stereotyped blacks. Black comic performers like George Walker and Bert Williams, who became an enormously successful team in the late nineteenth and early twentieth centuries, performed what would be called "coon" roles. James Weldon and Rosamund Johnson, Will Marion Cook, Bob Cole, Paul Laurence Dunbar, Ernest Hogan, and other black song-

writers of the turn of the century wrote "coon songs" in the tradition of the popular music of the day – songs like "All Coons Look Alike to Me" (1899) and shows like *A Trip to Coontown* (1898). To be sure, these composers tried to work beyond the constraints of the form, but they were bound by the form in any case. Perhaps this sort of work caused these blacks some special sort of angst – doubtless, it gave them a particular sense of irony – but it may not have been nearly as distressing as many of us today are apt to think that it was. Black audiences and black people in general have always found the popular stereotypes of themselves to be quite funny, in a certain context. Williams and Walker and early black musical stage composers were popular with both black and white audiences. (Think of how Fats Waller and Louis Armstrong, the two most popular jazz musicians among whites during the 1930s, used humor to sell the music.)

Black audiences and black people in general have always found the popular stereotypes of themselves to be quite funny, in a certain context.

Also to emerge in the postbellum years would be the humorous but slyly subversive character of the old "uncle" storyteller; white Southern journalist Joel Chandler Harris's Uncle Remus is, of course, the most famous example, but black writer Charles Chesnutt's Uncle Julius is also well known in African American literary history. In as much as modern-day black stand-up comics are storytellers (and the best of them are, rather than simply rapid-fire one-line jokesters like Bob Hope or Henny Youngman), they, in some measure, hearken back to this tradition. With so much of the history of black humor rooted in slavery and minstrelsy, it is no wonder that blacks are ambivalent or deeply divided about what the group should think is funny.

Take the great black comic actor Stepin Fetchit (1902 – 1985), who rose to great heights as a character actor in Hollywood in the late 1920s and 1930s. When Fetchit became popular with white audiences, black commentators, civil rights leaders, and black intellectuals began to condemn him as something abhorrent, as politically retrograde, as a horrible stereotype of the Old Negro, so to speak. But Lincoln Perry, who created the character of Stepin Fetchit, for years developed and honed his act by performing in front of black audiences who rolled in the aisles laughing. They loved him when he was performing in all-black venues. He performed the same act in Hollywood films and became one of the most criticized men in the national black community. Why? All Lincoln Perry was trying to do was take an ethnic character he had created and make it cross over to wider audiences as an American type, not unlike the Yankee Peddler or the American backwoodsman. However, Perry was too successful and became tied as an actor to his character in much the same way that Paul Reubens became tied to his 1980s character Pee-wee Herman. His character ceased to be an artistic creation and was interpreted instead as a pathologized projection.

Why couldn't Stepin Fetchit be seen as an American type like the neurotic Jew or the singing cowboy or the Irish Catholic priest? Lincoln Perry had great success getting whites, as well as blacks, to laugh genuinely at his creation. The problem was that blacks thought whites were laughing for different reasons. Fetchit, like minstrelsy, politicized laughter. He posed a difficult question with his characterization: what exactly made him funny to his audiences? The problem in America with group humor is not that outsiders won't get the joke you make about your own group but that they will get the joke at your expense. Does humor not cross boundaries well, or are all groups made uneasy when the taboos they wish to explore or explode in their in-group humor is exposed to others?

The popular, long-running radio comedy *Amos and Andy* caused both a similar and a somewhat different set of dilemmas. Premiering in 1928, the show was created by two white actors, Freeman Gosden and Charles Correll, who portrayed African American migrants who leave the South for Chicago, from where the program was

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broadcast. The show was very popular with black listeners. Indeed, when the actors made personal appearances, blacks would turn out along with the show's legions of white fans. The actors appeared in blackface in publicity photos and also in a 1930 movie called *Check and Double Check*, where they looked very odd in scenes with actual black actors. They often appeared in character at personal appearances without any problems. People accepted them as Amos and Andy.

In 1931, Robert Vann, publisher of the African American newspaper the *Pittsburgh Courier*, began a campaign to have *Amos and Andy* removed from the air because he felt its characterizations of low-class blacks were repellent and insulting. Here, again, the racial politics of comedy were implicated: if blacks and whites both laughed at a stereotyped black character, they could not be laughing for the same reason; and whites, almost certainly, could be laughing only because this sort of comedy reinforced their sense of superiority. In addition, whites played these roles, which only emphasized the denigrating minstrel roots of *Amos and Andy*. The campaign was not successful, but it did divide the black community about the show, only not enough to diminish greatly the number of blacks who listened to it. This division between the black elites, who hated the program, and everyday blacks, who were less inclined to take offense or to make being offended a big issue, reemerged during the years when *Amos and Andy* was broadcast as a television show in the early 1950s, when it featured black actors in all the roles. Although the National Association for the Advancement of Colored People (NAACP) had not joined the *Pittsburgh Courier* in its protest against the radio program, it did actively lead the charge against

the television program. The NAACP was successful, and the show was canceled after two years despite enjoying good ratings.

By the early 1950s, black actors generally avoided comic roles. The major black actors who emerged in this period – Sidney Poitier, Harry Belafonte, James Edwards, Ruby Dee, and Dorothy Dandridge – did not do comedy, possibly because Hollywood was afraid to cast them in such roles but probably because the actors felt comedy carried the taint of minstrelsy. These black actors felt themselves to be the children of Paul Robeson, and they were highly sensitive to the idea of playing demeaning roles. And nothing demeaned a serious black actor quite like comedy, especially when it meant being funny for a white audience.

Many people, especially those who have never watched the 1939 epic *Gone with the Wind*, are convinced that Hattie McDaniel's Oscar-winning role of Mammy, the stereotypical overweight, nurturing, bossy slave woman, was a comic role, not the dramatic role it actually was. Louise Beavers's Mammy-like performance in the 1934 version of *Imitation of Life* was also largely a dramatic, not comic, role. These were the two most substantial roles for black actors appearing in Hollywood films before World War II, and while both films attracted black audiences – *Imitation of Life* more so than *Gone with the Wind*, which was not critically well received in black newspapers – the films were meant for whites. Thus, black audiences felt uncomfortable with the black roles, sensing that they were more comic than they actually were.

Lena Horne, endorsed by Walter White of the NAACP as the antidote to black servile comic actors, starred in *Cabin in the Sky* and *Stormy Weather*, musical motion pictures that were produced in 1943, had primarily black casts, and were made to appeal to African Americans. One of Horne's roles was clearly comic – the sexy black temptress, another stereotype that would ensnare Dorothy Dandridge in the 1950s. Black audiences on the whole felt more comfortable with the humorous stereotypes in films made explicitly for them. (After World War II, Ethel Waters would replace Hattie McDaniel playing "Mammy" roles, and singer/dancer Pearl Bailey would become a new comic voice as the sassy, outspoken black woman, a sort of black Eve Arden.) The political issues involved in the depiction of blacks in film for both black and white audiences and for black actors were so complicated, so fraught with hazard, that the line between what was comic and what was dramatic was blurred.

More than a little controversy arose among blacks when Poitier and Dandridge agreed to play the leads in Otto Preminger's 1959 film version of *Porgy and Bess*, roles that neither Poitier nor Dandridge wanted to do because they felt the characters were racial stereotypes. The fact that *Porgy and Bess* is not a comedy but an important opera (the only performable opera featuring blacks in all major roles) was probably the only reason these black actors agreed to play in it at all.

The political issues involved in the depiction of blacks in film . . . were so complicated, so fraught with hazard, that the line between what was comic and what was dramatic was blurred.

In light of all of this, Bill Cosby emerged in the 1960s as an extraordinarily important figure in American entertainment. When he was given a lead role in the television series *I Spy*, he became the first African American to star in a dramatic series. However, Cosby had come to the attention of the public as a stand-up comic. From 1962 to 1965 he rose rapidly, playing all the noted comedy clubs and releasing a hit comedy album, *Bill Cosby Is a Very Funny Fellow . . . Right*, in 1964. Cosby was one of three important black stand-up comics to appear in the 1960s who were very different from the type of black comics who had existed before. The other two were Dick Gregory and boxer Muhammad Ali. All three were "clean" comics in the sense that they did not aim their material at an adult audience by using obscene language or discussing sex. Each was the result of the civil rights movement.

Early in his career, Ali became a juvenile comic, reciting humorous verse as a way of bringing attention to his boxing matches. He even recorded an album of such poetry for Columbia Records in 1963, with liner notes by poet Marianne Moore. When he joined the Nation of Islam (NOI), shortly before his 1964 title bout with champion Sonny Liston, his comic antics took on a much more political edge. For a time, Ali's comedy bothered many sportswriters and boxing fans because it made it seem as if he did not take his sport seriously. Blacks were also bothered in the early days of Ali's career because they felt his comedy was demeaning and made Ali look silly in comparison to the great race hero Joe Louis, who never joked and rarely smiled publicly. Later, his comedy tended to denigrate the politics (as Ali chose to define them) of his black opponents.

Ali's comedy also bothered the Honorable Elijah Muhammad, who hated sports, especially boxing, though when Elijah Muhammad censored Ali, it was not for his comedy. (Members of the NOI almost never smiled publicly and were known, in fact, for being grim and puritanical. They could express humor at times, however, in the sermons they delivered to the faithful in their mosques, usually at the expense of whites or establishment blacks who were considered Uncle Toms. It must be noted as well that Ali's comedy was unusual for a high-performance athlete – although the subject of race, sports, and comedy is historically and culturally complex and worthy of considerable explication in another context – and certainly for a boxer.) In 1969, while in the midst of his three-and-a-half-year exile from boxing because of his opposition to the draft, Ali was suspended from the NOI and shunned by its members for one year for expressing in an interview a willingness to return to boxing to make money. Muhammad thought Ali was groveling, degrading himself and the organization.

Gregory, who made the civil rights movement and race part of his routine of acerbic, wry observations on American cultural and political hypocrisy, belonged to a school of liberal, Cold War political comics of the day that included Mort Sahl, Tom Lehrer, and Vaughn Meader. Ali combined elements

of Jerry Lewis with the comic bragging of Depression era–baseball pitcher Dizzy Dean Gregory, and Ali racialized their types of comedy in a new way, making their white audiences aware that they were speaking as black men. Of course, Williams and Walker, Stepin Fetchit, and Amos and Andy were also making their audiences aware that they were "black men," but Ali and Gregory were self-aware and were not making humor that could in any way make whites laugh at the spectacle of their own degradation, their "naturally comic" position in life, or their naturally fun-loving, carefree disposition. I might add here that singer/actor/songwriter Oscar Brown, Jr., also popular at this time, was like Gregory in that he occasionally did humorous political songs with a withering satirical edge; for example, "Forty Acres and a Mule," about reparations for slavery, appears on his 1964 album, *Mr. Oscar Brown, Jr. Goes to Washington*.

Bill Cosby's routines about growing up in a normal American family and being an American dad made not only Cosby but also a fantasy image of the black family mainstream.

Cosby never made a point of reminding his audiences that he was black. He avoided being political – to the point of not even casually mentioning political figures of the time – and this probably had a great deal to do with his enormous success. Nipsey Russell and Flip Wilson, both successful crossover black comics of the day, generally avoided politics as well.

In this respect, Cosby was not a bridge figure when it came to bringing a version of black stand-up comedy off the "Chitlin' Circuit," the circuit of black theaters and urban venues where a constellation of black comics – including Moms Mabley, Pigmeat Markham, Redd Foxx, and Skillet and Leroy – normally performed for black audiences. Although some of Mabley's and Markham's recordings for Chess Records were given radio airplay, by and large these were adult comics whose routines were far too raunchy for children. Cosby's comedy, which he mostly performed for integrated or largely white audiences, was not closely related to what these black comics performed for black audiences. The form of black comedy seen on the Chitlin' Circuit would be exposed to wider audiences in the 1970s through the crossover success of Redd Foxx, and many of his comic peers would wind up appearing on his hit television show, *Sanford and Son*, where they performed cleaned-up, watered down versions of their acts. Neither blacks nor whites seemed troubled by this, and the show was popular with both groups, although some more-militant black intellectuals condemned the show as minstrelsy.

During and after the civil rights years, Marxist and nationalist blacks regularly condemned most black comedy as a form of minstrelsy, in effect saying that blacks could never escape these stereotypes and that making whites laugh was politically disempowering and socially degrading. Most blacks, especially among the black elite, likely would have been unhappy had the Redd Foxx – Chitlin' Circuit – style of black humor been widely exposed to whites in the 1950s, when it was seen (again, especially by black elites) as low-class entertainment.

Bill Cosby was, in effect, a middlebrow comedian. His routines about growing up in a normal American family and being an American dad made not only Cosby but also a fantasy image of the black family mainstream in the days of both Daniel Patrick Moynihan's report on black family pathology (*The Negro Family: The Case for National Action*) and such television comedies about white families as *The Dick Van Dyke Show*, *The Adventures of Ozzie and Harriet*, *Leave It to Beaver*, *The Donna Reed Show*, *Make Room for Daddy/The Danny Thomas Show*, and *Father Knows Best*. By the late 1960s and early 1970s, however, many African Americans, in their militancy and their quest for cultural authenticity, were more apt to feel that Chitlin' Circuit humor was an honest and compelling expression of blackness and would aggressively identify with it.

The backlash against Richard Pryor was part of a larger dissatisfaction among many blacks with the new, gritty, ghetto image of blacks that was portrayed in popular culture, especially in blaxploitation films such as "Shaft," "Superfly," and "Black Caesar."

During the age of integration, from the 1950s to the mid-1960s, black performers and black audiences were freed from certain types of confinement that dictated how they were expected to relate to the larger white world around them. Black performers did not necessarily have to do race-based acts or make use of comic racial stereotypes. Black audiences, during this time, felt more comfortable with this form of group humor being performed for white audiences. In fact, black audiences were sometimes visibly proud of this.

In the 1970s, Richard Pryor arrived as the major black comic of the day. Indeed, Pryor became one of the seminal stand-up comics of post–World War II America. Although Pryor started out in the 1960s very much in the vein of Bill Cosby, doing mainstream, television-safe comedy, he had shifted by the early 1970s, when he began to use obscenity in his work. This was around the time that George Carlin, a white stand-up comic who became a major figure as well, changed his act from mainstream to more edgy by incorporating profane language.

For both comics, profane language was used not so much to deliver raunchy jokes but to be political, antibourgeois, and anti-establishment. They were largely building their 1970s routines around the sensibility of comic Lenny Bruce, unquestionably the most influential and most controversial of all postwar stand-up comics. Pryor, in effect, became the anti-Bill Cosby. And although

Pryor was enormously popular, he faced a backlash from some blacks who were especially disturbed by his excessive use of the word *nigger*. W. E. B. Du Bois, in a 1942 article about black humor and black audiences, wrote, "The use of the word 'nigger,' which no white man must use, is coupled with innuendo and suggestion which brings irresistible gales of laughter." So, Pryor was following a tradition in black humor and, in becoming the anti-Bill Cosby, was in many respects reinventing an older black-comic practice for contemporary audiences, both black and white. Indeed, the fact that Pryor attracted a large white audience in addition to appealing to blacks may have had something to do with the black press criticizing his use of the word *nigger*. (In the 1920s and 1930s, segments of the black public criticized filmmaker Oscar Micheaux for using the word "nigger" in his all-black cast films; some strenuously criticized Paul Robeson for appearing in the film version of *Emperor Jones* (1933), where the n-word was used several times.)

The backlash against Pryor was part of a larger dissatisfaction among many blacks with the new, gritty, ghetto image of blacks that was portrayed in popular culture, especially in blaxploitation films such as *Shaft* (1971), *Superfly* (1972), *Black Caesar* (1973), and other such films that were popular in the early and mid-1970s. But it should not be assumed that this response was largely from the educated black middle class. Some were opposed to it, of course, but many in this group were among Pryor's biggest fans. Working-class, black church folk, black Muslims, older blacks of various stripes, and blacks in the "uplift trade," as it might be called, were among those who strongly opposed blaxploitation cinema as romanticizing black pathology and being a poor influence on black adolescents. This debate would return with a vengeance with the emergence of rap, particularly gangsta rap, in the 1980s and 1990s.

As nearly all blaxploitation films were ultra-violent and action-oriented, comedy became, ironically, an antidote. Bill Cosby appeared in a series of clean comic films directed by Sidney Poitier – *Uptown Saturday Night* (1974), *Let's Do It Again* (1975), and *A Piece of the Action* (1977) – that were meant to combat blaxploitation cinema. Who would have thought that a family-oriented message of racial uplift would now be found in black comedy and that someone like Sidney Poitier – the ultra-serious, dignified black actor of the 1950s and 1960s – would direct comic black films? But Bill Cosby's clean comedy of the 1960s made it possible for blacks to do comedy and still maintain their sense of racial pride – not to be the objects of laughter at their own expense. Indeed, these films enabled blacks to reconstruct their humor of the era of Walker and Williams without the tint of degradation. As Du Bois noted in his observations on black humor: "[Black comic actors] imitate the striver, the nouveau riche, the partially educated man of large words and the entirely untrained," which is precisely what these films did. In fact, these comedies even made fun of blaxploitation films themselves. As it turned out, the pressure on Pryor was sufficient to make him abandon the use of the word *nigger* for a time; in some ways, this in-group protest slowly became the undoing of his act. Regardless of whether this response was a misdirected act of group self-censorship, it should hardly seem surprising, coming from a persecuted minority that can never quite be sure how it can or should protect itself, especially from its own impulse to find sources of its degradation funny.

By the late 1970s blacks were divided over the image of blacks in popular culture and in comedy in ways that were similar to the divide blacks felt about Stepin Fetchit, comic actress Hattie McDaniel, and *Amos and Andy*. This divide continues to persist. The more things change, as the old saying goes, the more they remain the same. But as any good historian will note, this was not quite the same at all. No conflict is ever repeated the same way, if only because the actors always change and so does the audience. ■

Black Women, Black Humor

Glenda Carpio

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Many critics have noted that men have had much more freedom in doing physical comedy because they have had an easier time displaying their bodies than have women. One can easily see how race would further complicate this dynamic. Erika Kreger reminds us that in the United States not until the late nineteenth century did critics come to see wit and humor as incompatible with femininity. Indeed, she argues, in "the mid 1800s, women humorists were often popular and acclaimed." Yet the humor they practiced was neither necessarily politically radical nor performed; it was largely textual. Performing on stage was not an option for women, especially women of color, unless they joined vaudeville shows, where their place was decidedly ambivalent. The woman entertainer was usually included to "make the place fit for decent women, yet everyone 'knew' that she was not decent herself." Women could also join the minstrel troops of the late 1860s, but there they were usually featured as giddy sex objects and burlesqued in much the same ways as plantation stereotypes of African Americans.[1] Traditionally, women across divisions of race have been relegated to restrained wit – sly humor but not the raucous, screaming, demonstrative kind.

[1] Erika M. Kreger, "The Nineteenth Century Female Humorist as 'Iconoclast in the Temple': Gail Hamilton and the Myth of Reviewer's Disapproval of Women's Comic-Ironic Writings," *Studies in American Humor* 3 (11) (2004): 5 – 38.

Against this background we have some significant pioneers. Among white American women we have Lucille Ball and Lily Tomlin, to name two giants, and among African American women we have the early blues singers Ma Rainey, Bessie Smith, and later Nina Simone, who sang of wanting "a little sugar in my bowl . . . a little hot dog between my rolls." Later figures such as Whoopi Goldberg and Anna Deavere Smith have experimented with comedy and performance art. The so-called Queens of Comedy, including Adele Givens, Mo'nique, Cheryl Underwood, Laura Hayes, and Sommore are comediennes whose work was first showcased on HBO's *Def Comedy Jam* in 2001. Their work plays off the persistent stereotypes of black women as domineering, often large, emasculating women who fail to conform to essentialized notions of womanhood. These comediennes consistently focus on the thematic issues of body image, male-female relationships, and racial and gender identities. But they also often reinforce stereotypes of black female sexuality by relying heavily on their own often overly sexualized personas.

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To explore the impact of these stereotypes on the development of black humor among black women, we need to look back on the work of Moms Mabley and Josephine Baker, two figures who embodied and manipulated two of the most persistent stereotypes of black femininity: the asexual Mammy and the slatternly Jezebel. We also need to look at the present-day work of Wanda Sykes, a comedienne who has been able to find a middle ground in creating an embodied form of comedy, one that does not erase her sexuality, as with the grandmotherly Moms Mabley, or depend upon it, as with Josephine Baker and the Queens of Comedy.

For centuries, African Americans have faced racism, in its various manifestations and guises, through a rich tradition of humor.[2] And for centuries, people who oppressed them found that humor puzzling – how could a people so oppressed find any reason to laugh? Minstrelsy went a long way in "explaining" the puzzle: black people laughed because they were simpletons.

Yet black American humor began as a wrested freedom, the freedom to laugh at that which was unjust and cruel in order to create distance from what would otherwise obliterate a sense of self and community. Until well into the twentieth century, however, that humor had to be cloaked in secrecy lest it be read as transgressive and punished by violence. Hence the popular slave aphorism, "Got one mind for white folk to see / 'Nother for what I know is me."

Despite the life-threatening injunctions against black laughter, African American humor flourished at first under the mask of allegory and increasingly in more direct forms. It developed a Janus-faced identity. On one side was a fairly nonthreatening form that catered to whites' beliefs in the inferiority of blacks while usually masking aggression. On the other side was a more assertive and acerbic humor that often targeted racial injustice but was generally reserved for in-group interactions.

For black Americans, humor has often functioned as a way of affirming their humanity in the face of its violent denial. In order to confront the maddening illusions of race and the insidiousness of racism, black folk have laughed long and hard, perhaps in the tragicomic notes of the blues or in the life-affirming spirit of righteous insurgency – or both. Black laughter is, however, not only a coping mechanism, although most people think of it only in this fashion. Black humor is also a rich source of creative energy. Still, by most accounts, African American humor, like other humor that arises from oppression, has provided a balm, a release for anger and aggression, and a way of coping with the too-often-painful consequences of racism.

The so-called Queens of Comedy . . . play off the persistent stereotypes of black women as domineering, often large, emasculating women who fail to conform to essentialized notions of womanhood. . . . But they also often reinforce stereotypes of black female sexuality by relying heavily on their own often overly sexualized personas.

In this way, black humor has been linked to one of the three major theories of humor: the relief theory made popular by Sigmund Freud, which posits that we laugh as a way to release pent-up aggression. Freud claimed that "tendentious jokes" – of which he identified two main kinds, the obscene and the hostile – allow the joker and his audience to release energy used for the purposes of inhibition. Much, but certainly not all, African American humor can be understood as a kind of relief-inducing humor. Indeed, under the violent restrictions of slavery and segregation, African Americans developed the art of tendentious jokes so well, in particular those that mask aggression, that often they left whites "with the baffled general feeling that [they had] been

[2] An expanded form of the background presented here can be found in Glenda R. Carpio, *Laughing Fit to Kill: Black Humor in the Fictions of Slavery* (New York: Oxford University Press, 2008).

lampooned [before their very eyes] without quite knowing how."[3] Among themselves, however, African Americans have expressed aggression toward their oppressors more openly.

African American humor is also, although less commonly, linked to a second major theory of humor: the superiority theory, which posits that we laugh at other people's misfortunes. The traditions of signifying, "playing the dozens," and "boasting and toasting" belong to this kind of humor, although in the verbal battle of "capping" and "yo mamma" jokes verbal wit is savored over mean-spirited competition or put-downs. The signifying tradition is generally considered an example of mother wit and departs significantly from the Freudian model of humor, which stresses sublimation, because it relishes exposure and does not depend on the joke form. Instead, this humor is mainly attitudinal and visual and depends on the verbal dexterity of the dozens, the toasts (long, metrically and rhythmically complex compositions), and the telling of "lies," or stories. Signifying remained largely segregated until Richard Pryor broke out of his original image as a slim, mild-mannered comedian who, believe it or not, never cursed and usually told charming jokes patterned after Bill Cosby's material. Pryor began performing revolutionary acts for mixed audiences in the late 1960s, and thus was largely responsible for desegregating African American humor. Black comedians before Pryor, notably Moms Mabley, Dick Gregory, Godfrey Cambridge, Flip Wilson, Red Foxx, and Bill Cosby, had introduced aspects of black humor to mixed audiences, but it was Pryor, after a remarkable self-transformation, who brought all aspects of black humor to the stage. In a sense, he "outed" black humor from the closely guarded circles within which black folk had kept it since slavery.

Rarely is black humor connected to the third (and for me the most interesting) theory of humor: the incongruity theory, which suggests we laugh when our expectations are disturbed. The humor of incongruity generally entails the playing of "what if" games that suspend normativity. These are games that momentarily reconfigure habits of mind and language and that can lead to what Ralph Ellison, after Kenneth Burke, called "perspective by incongruity." At its best, the humor of incongruity allows us to see the world inverted, to consider transpositions of time and place, and, especially when the humor is hot enough to push our buttons, to question the habits of mind that we may fall into as we critique race.

Black American humor began as a wrested freedom, the freedom to laugh at that which was unjust and cruel in order to create distance from what would otherwise obliterate a sense of self and community.

This is the kind of humor I deal with in my book, where I especially focus on how writers and artists from both the civil rights/Black Power and post–civil rights/Post Soul generations stage "rituals of redress" with respect to American slavery. At the center of the project is a concern about the abiding impact of the racial and gender stereotypes produced by slavery and how artists and writers use humor to confront the legacy of these stereotypes.

Although the history of early African American women comics has been largely ignored, Jackie "Moms" Mabley has received critical attention. Born in 1897 in North Carolina, Mabley became a dancer and singer by the time she was sixteen but quickly turned to comedy in traveling tent shows. Early in her career Mabley assumed the character of an elderly earth mother. As Mel Watkins puts it, "The guise provided the buffer or intermediary necessary to quell resistance to a woman doing a single comic routine." For Lawrence Levine, "The appeal of Mabley's humor was precisely its degree of folkishness. . . . Her antique clothing, her easy manner, her sense of kinship with her audiences – marked by her references to them as 'children' – her lack of pretentiousness, the easy familiarity of her language, her movements, her dialogue, were at the core of her vast popularity."[4]

Mabley challenged the notion of black women as domineering and emasculating while offering black Americans group recognition, a sense of affiliation, and comfort. But Mabley's approach was not without risk. Her decision to adopt a grandmotherly persona reinforced a notion of black femininity patterned after the asexual Mammy figure. For, although she *was* known for telling risqué, even bawdy jokes (usually about how much she liked younger men), she used the mantle of her grandmotherly figure and demeanor to hide any real possibility of marking her body as sexual. Her guise would ultimately betray any gesture toward a liberated sexuality.

Josephine Baker, by contrast, combined sex appeal and comedy in her dance performances. She famously used a skirt of bananas to flesh out but also to mock the primitive persona she had established in her debut in Paris in 1925. A beautiful woman and gifted dancer, Baker exaggerated stereotypes of black female sexuality by performing numbers such as the *Danse sauvage* while minimally clad in a "primitive' costume: bare-breasted but with feathers, wings, and other such signifiers attached to her extremities. Often she would be chased and captured on stage by white hunters.

Baker sought to command some authority in her self-production as the primitive sexualized Other, combining a form of feminine sexuality with a clownish disposition. As Susan Gubar puts it, "Throughout her career, Baker sauced her sexual numbers with comically exaggerated, antic gestures [she was known, for example, to cross her

[3] John Dollard, *Caste and Class in a Southern Town* (New York: Anchor, 1949), 309–310. First published in 1937 and quoted in Lawrence Levine, "Black Laughter," in *Black Culture and Black Consciousness* (New York: Oxford University Press, 1977), 313.

[4] Mel Watkins, *On the Real Side: A History of African American Humor from Slavery to Chris Rock* (Chicago: Lawrence Hill Books, 2002); and Levine, "Black Laughter," in *Black Culture and Black Consciousness*.

eyes in burlesque fun] that distanced her from the sexual frenzy she was putting on display."[5] Baker also made a point of contrasting her on- and off-stage personas to emphasize the artifice of her act. Off stage she was a sophisticated and glamorous beauty and later in her career a devoted civil rights promoter. And long before Angelina Jolie, she adopted children from all over the world and raised them in her castle in France.

Yet Baker was so typecast by her early role that she encountered a great deal of difficulty when she tried to develop her singing and acting in pursuit of a more sophisticated persona in the 1930s. In particular, she became almost synonymous with her skirt of bananas, which took on a life of its own. "Oh! How this idea has turned ridiculous!"

The incongruity theory of humor . . . suggests we laugh when our expectations are disturbed.

Baker said of the costume. "How many drawings and caricatures it has inspired! Only the devil, apparently, could have invented something like that."[6] While the identity of the costume designer remains unknown, Baker's appeal in her primitive guise is all too clear. Baker became the banana belt, thus inadvertently conflating two forms of colonialist consumption: that of a colonial product that, like sugar, tobacco, or coffee, has frequently been associated with pleasure; and that of black female bodies. During the 1930s, Baker made overt efforts to work against her typecasting, especially by adding androgynous twists to her act. She also redefined her famous skirt. She turned the bananas into "absurd signifier[s] of black male phallic threat." As early as 1927, the bananas had "become ever harder and more threatening" – so much so that they looked more like spikes than bananas.[7]

What happens when the black female performer focuses on *form* as much if not more than on content? What happens when she skillfully manipulates triple jeopardy, strategically *de-emphasizing* one aspect (in this instance race) while highlighting another (gender)? Wanda Sykes adopts the laid-back attitude of Moms Mabley without denying her sexuality. She also uses her body to address issues of gender without exoticizing her own status as a black woman. Her performance *Tongue Untied* (2003) is a measure of the progress, albeit slow, we have made since Mabley and Baker. But this style of manipulating race and gender is also particular to Sykes, who, at least in stand-up (she is still relegated to the role of the maid in films—see *Monster in Law* and even Chris Rock's *Down to Earth*), shows a great deal of talent and promise for what may become the future of black women comedic performers in the public sphere.

Tongue Untied begins with Sykes addressing politics. By starting with politics, a realm long denied to women, Sykes distinguishes herself from performers like the Queens of Comedy and other female comedic talents across gender and race. After four segments in which she addresses political issues – a critique of George W. Bush's engineering of war and his manipulation of fears about weapons of mass destruction – Sykes turns to topics that are more traditional in the work of women comedians; namely, issues involving gender and sexuality. However, she approaches these topics in surprising ways. One skit focuses on Sykes visiting a strip club in Florida, where she plays the role of a highly ironic participant observer, a woman witnessing straight men as they satisfy their cravings to see women's bodies. "How do men ever get any work done?" Sykes asks facetiously, referring to the obsessive ways men can fetishize women's bodies. At any given moment, the intense longing to see women, especially the most tabooed parts of their body, may take hold of a man, rendering him helpless. "Let's go look at it!" one of them may say in the midst of work and take off to the strip club. Sykes's participation in the whole enterprise softens this potentially chastising gesture, allowing her audience to laugh at the obsessions that besiege men without rendering them the butt of the joke. She then skillfully transitions into a satire of the obsessions that besiege women, turning the tables on members of her audience that might have felt privileged. Throughout the skit, she de-emphasizes her racial identity, though she casually makes it part of the show through particular language choices and allusions. She also moves on the stage in a manner that marks her as a sexual being without making that sexuality the defining characteristic of her identity. The fact that Sykes recently came out as a lesbian also marks our reading of her performance, enriching our understanding of how she manipulates stereotypes of race and gender without making her own body bear the burden of that manipulation. ■

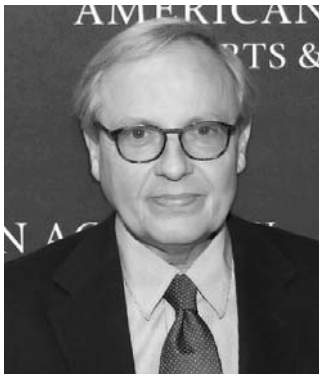
What happens when the black female performer focuses on form as much if not more than on content? What happens when she skillfully manipulates triple jeopardy, strategically de-emphasizing one aspect (in this instance race) while highlighting another (gender)?

[5] Susan Gubar, *Racechanges: White Skins, Black Face in American Culture* (New York: Oxford University Press, 1997), 115.

[6] Terri Francis, "Embodied Fictions, Melancholy Migrations: Josephine Baker's Cinematic Celebrity," *Modern Fiction Studies* 51 (4) (2005): 836.

[7] Michael Borshuck, "An Intelligence of the Body: Disruptive Parody through Dance in the Early Performances of Josephine Baker," in *EmBODYing Liberation: The Black Body in American Dance*, ed. Dorethea Fischer-Hornung and Alison D. Goeller (Piscataway, N.J.: Transaction, 2002), 53.

Black Humor: Reflections on an American Tradition



Werner Sollors

Werner Sollors is the Henry B. and Anne M. Cabot Professor of English Literature and Professor of African and African American Studies at Harvard University. He has been a Fellow of the American Academy of Arts and Sciences since 2001.

"Black humor literature is similar to the literature of existentialism in that it begins with the same assumption – that the world is absurd."[1] This is how Alan R. Pratt defines the term in the introduction to his edited collection, *Black Humor: Critical Essays*. He then illustrates his definition with a passage from Jean-Paul Sartre. Postmodern authors, most notably Thomas Pynchon, are among the best practitioners of black humor literature. Pratt also offers a number of alternative terms for black humor, among them apocalyptic comedy, dark comedy, pathological comedy, nihilistic humor, tragic farce, and comedy of the absurd.[2]

In his book *Black Culture and Black Consciousness* (1977) the late historian Lawrence Levine highlights how absurd the rules were that governed the worlds of slavery and Jim Crow and how this very absurdity invited numerous African American jokes that were recorded long before existentialism. This gives the term *black humor* a specifically racial meaning and context in America.

Levine mentions the "story of a slave who was caught killing and eating one of his master's pigs and who mockingly rationalized his act by arguing, "Yes, suh, Massa, you got less pig now but you sho' got more nigger."[3] Here the principle of ownership is turned against itself by a witty slave. Levine also tells of the white deacon in Mississippi who walks into his church and finds a Negro standing there. "Boy," he calls out. "What you doin' in here? Don't you know this is a white church?" "Boss, I only just got sent here to mop up the floor," the black man informs him. "Well, that's all right then," the deacon responds. "But don't let me catch you prayin'."[4] The punch line speaks volumes about Jim Crow religious hypocrisy.

The witty repartee seems to restore justice within the realm of humor for a second, fending off the possibility that outsiders will "get" black humor at the expense of blacks (as Gerald Early put it) and giving whites the uneasy feeling that somehow they have been lampooned by black laughter (as Glenda Carpio said). However, many other jokes suggest the insurmountability of the burden of race by taking for granted the absurdity of the world made by slaveholders and segregationists.

Glenda Carpio writes in *Laughing Fit to Kill: Black Humor in the Fictions of Slavery* that "African American humor has been, for centuries, a humor of survival. It has been a safety valve, a mode of minimizing pain and defeat, as well as a medium capable of expressing grievance and grief in the most artful and incisive ways."[5]

A black man is going to the voting booth to cast his vote. The sheriff tells him, "Boy, first you've got to pass a reading test. Read out this here headline," and he hands him … a Chinese newspaper. As if he were reading the headline, the black man slowly and deliberately enunciates, "Negroes won't vote in Mississippi again this year." The response is ingenious, in part because it acknowledges the continuation of the grievance of voter disenfranchisement.

A conductor who tells a Negro passenger to go to the Jim Crow car gets this reply: "I done quit the race." Here the humor points to the strange fact that unlike pretty much all other social categories, being a Negro is apparently not one that can be shed.

The absurdity of the rules that governed the worlds of slavery and Jim Crow invited numerous African American jokes that were recorded long before existentialism.

In the Harvard library catalog, I found a book called *Black Humor*, which was humorously located on the Black Power shelf. Published in 1970, it was authored by Charles Johnson, who later became a National Book Award-winning novelist. (Anyone interested in black humor should be sure to read Johnson's *Oxherding Tale*.) *Black Humor*, a short book of cartoons, contains inappropriate-seeming pages on slavery and its legacy. For example, the caption under a sketch showing figures in the hull of a slave ship reads, "Say, why don't we have a singalong?" (Figure 1). A cartoon of a slave auction shows a man at a podium with a placard proclaiming, "We give trading stamps" (see page 29). Similarly, a two-panel cartoon shows a Klansman kneeling at his bedside (Figures 2 – 3). He prays, "Give me the strength to eliminate the inferior people ruining my nation." The next panel shows God's apparent answer, ironic and subversive: "Sho' nuff, boss!" As Bill

[1] I wish to acknowledge Leslie Berlowitz, who kindly invited me to participate in this panel, and Glenda Carpio, Gerald Early, and Jennifer Kurdyla, who made helpful comments. Charles Johnson was not only generous enough to grant permission to reproduce pages from his book *Black Humor*, but he also redrew five images to go along with his text from 1970. These newly drawn images are published here for the first time.

[2] Alan R. Pratt, ed., *Black Humor: Critical Essays* (New York: Garland, 1993), xvii.

[3] Lawrence Levine, *Black Culture and Black Consciousness: Afro-American Folk Thought from Slavery to Freedom* (New York: Oxford University Press, 1977), 309.

[4] Ibid., 312.

[5] Glenda R. Carpio, *Laughing Fit to Kill: Black Humor in the Fictions of Slavery* (New York: Oxford University Press, 2008), 230 – 231.

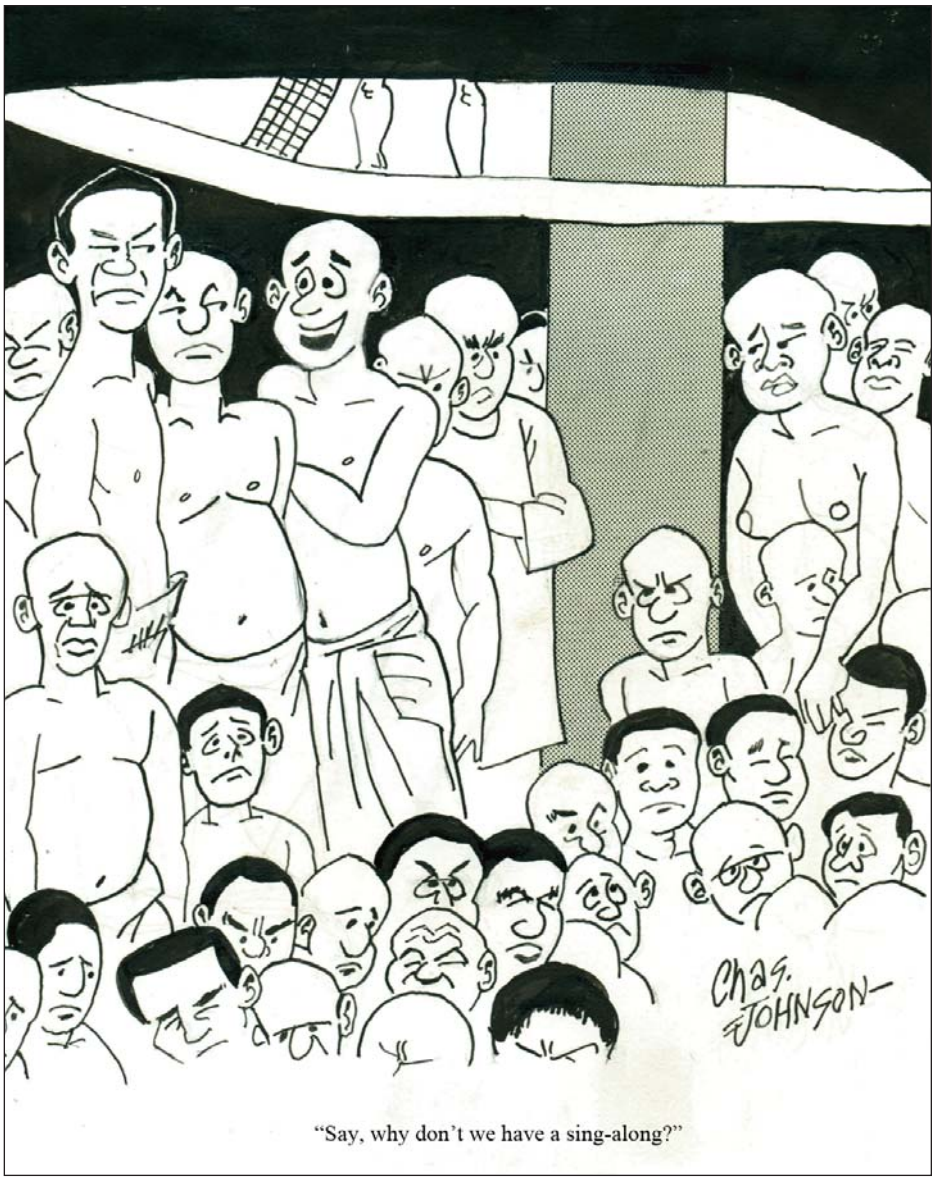


Figure 1

Cosby has said, God clearly has a sense of humor. One of the cartoons has acquired a particular poignancy in the past year. A mother is shown talking to a friend. The woman's young son is nearby, jumping on a white-looking doll. The caption below the image reads, "He may never be president, but he'll make a great militant" (Figure 4).

As "a mode of minimizing pain and defeat, as well as a medium capable of expressing grievance and grief," versions of black humor permeate American culture, as is visible in *A New Literary History of America*, a book I had the pleasure to coedit with Greil Marcus.[6] The book represents America in 219 chronologically arranged essays written by 201 authors, among them Glenda Carpio on Thomas Pynchon and Gerald Early on *The Wizard of Oz*, Tarzan, and integrating the military.

The specific black humor strain in *A New Literary History of America* appears in W. T. "Rip" Lhamon's essay "Rogue Blackness" (1830), which argues that Melville was reacting to the minstrel show number "The Black Barber" when he penned the literally double-edged scene in which the slave rebel Babo holds the razor against Captain Delano's neck: "The famous shaving scene at the center of Melville's 'Benito Cereno' (1855) tried to live up to the grave humor that Dan Emmett and Eph Horn had been performing on the minstrel stage for a decade and a half. This same blackface-derived shaving scene would still be reincarnate in Charles Chesnutt's 'The Doll' (1912)."[7] Lhamon also finds that the opening words of Frederick Douglass's first autobiography (1845) copped Jim Crow's come-on:

Rice: "Come listen all you galls and boys / I's jist from Tuckyhoe."

Douglass: "I was born in Tuckahoe."[8]

Lhamon goes on to speculate whether Douglass, like Thomas Rice, was thinking of that other Tuckahoe, the Virginia plantation that was the boyhood home of Thomas Jefferson, Mr. "Created Equal" himself.[9]

John Edgar Wideman, who wrote the essay on Charles W. Chesnutt for *A New Literary History of America*, comments that Chesnutt and Ralph Ellison are two authors who have noted with a distinct sense of humor that their "characters commit the unforgiving mistake of allowing themselves to fall asleep within someone else's dream, the dream that blacks and whites coexist peacefully, voluntarily, in a just, mutually beneficial arrangement. The wake-up call of riots, Ellison's staged in Harlem and Chesnutt's set in Wellington, North Carolina, expose the dream's fragility."[10] One of the microstories Wideman contributed to *Best African American Fiction 2010* explores similar themes:

> *Message*
> A message in red letters on the back of a jogger's T-shirt passed by too quickly for me to memorize exactly. Something about George Bush going too far in his search for terrorists and WMDs. A punch line sniggering that Bush could

[6] Greil Marcus and Werner Sollors, eds., *A New Literary History of America* (Cambridge, Mass.: Harvard University Press, 2009).

[7] W. T. Lhamon, Jr., "Rogue Blackness," in *A New Literary History of America*, ed. Marcus and Sollors, 204.

[8] Ibid., 203.

[9] Ibid.

[10] John Edgar Wideman, "Charles W. Chesnutt, *The Marrow of Tradition*," in *A New Literary History of America*, ed. Marcus and Sollors, 464.

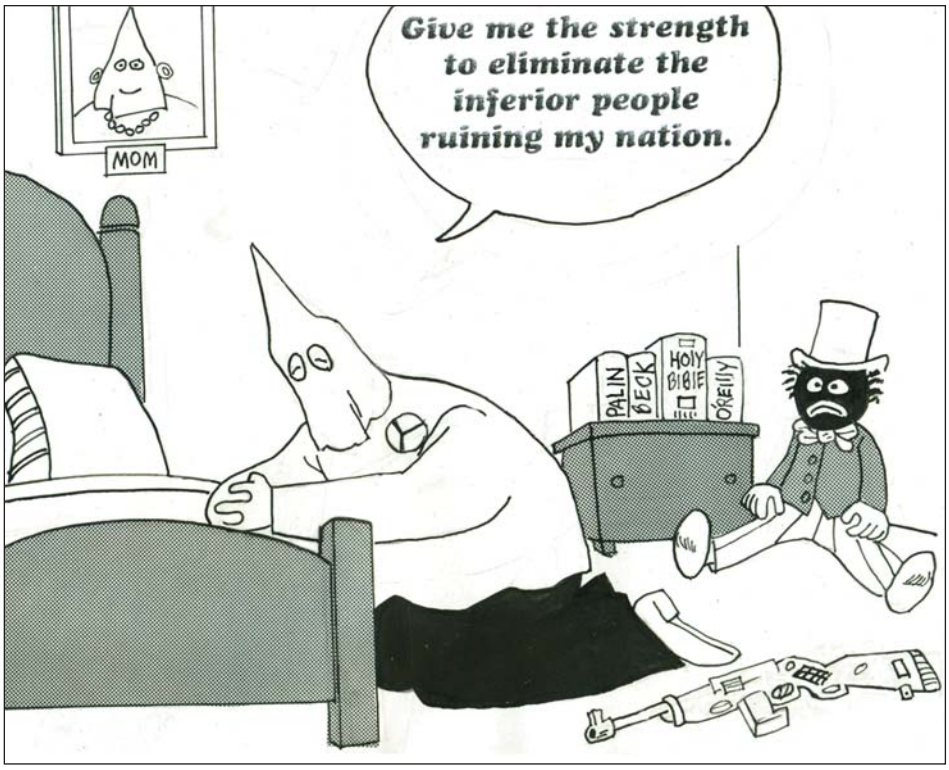


Figure 2

Figure 3

> have stayed home and found the terrorist he was looking for in the mirror. The message clever, I thought, and jacked the idea for my new line of black-lettered T-shirts: America went way too far looking for slaves. Plenty niggers in the mirror for sale.[11]

The "mirror" or "tarbaby" effect of white "hallucinatory" perception of blacks is also apparent in novelist Ishmael Reed's essay in *A New Literary History of America* on Mark Twain's *Adventures of Huckleberry Finn*, an essay that begins with the ironic comment that "structurally" the novel "is about as solid as a New Orleans levee" and ends with a passage rarely highlighted in discussions of Huck Finn:

> Huck cries, "I want my nigger," like the children of the suburbs who are addicted to gangster rap, like the white Southern children after the Civil War who craved their coon songs from New York. Twain exposes this bizarre hunger, this exotic yearning of those who despise blacks yet wish to imitate them. Who wish to be called "honey" by them. Who wish to be "petted" by them. Who wish to burn them, cut out their very entrails, and take them home with them. If you can't give us our nigger, they seem to say, we'll make do with Elvis. . . . Twain knew. *I want my nigger!*[12]

George Schuyler must be the godfather of black humor. His thoroughly irreverent novel *Black No More* (1931) is unsurpassed for its raucous jokes about the joke that is race. Jeffrey Ferguson (who wrote the entry on Sinclair Lewis's *Babbitt* in *A New Literary History of America*) finds in his study of Schuyler that the wisdom "of black humor . . . resided in its sharp recognition of the ludicrous and outlandish in American race relations."[13]

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[11] John Edgar Wideman, "Microstories," in *Best African American Fiction 2010*, ed. Gerald Early and Nikki Giovanni (New York: Random House, 2009), 180 – 191.

[12] Ishmael Reed, "Mark Twain's Hairball," in *A New Literary History of America*, ed. Marcus and Sollors, 380, 384.

[13] Jeffrey Ferguson, *The Sage of Sugar Hill: George S. Schuyler and the Harlem Renaissance* (New Haven, Conn.: Yale University Press, 2005), 32. See also Jeffrey Ferguson, "Sinclair Lewis," in *A New Literary History of America*, ed. Marcus and Sollors, 580 – 584.

"He may never be president, but he'll make a great militant."

Figure 4

This ludicrousness is present in many of the essays in *A New Literary History of America*, from Walter Mosley's reflections on "hard-boiled" prose to Monica Miller's comments on Zora Neale Hurston's rather different vein of humor.[14]

In 2001, conceptual artist Keith Townsend Obadike offered a version of the "I done quit the race" conundrum for the eBay era (Figure 5). Obadike put his blackness up for sale on the eBay auction site, a move that revisits the problem of voting and is also a self-reflexive comment on black humor itself. Sarcastically alluding to the legacy of slave auctions and to the racialism that makes "blackness" precisely a quality one can never shed, and following ordinary eBay conventions, Obadike gives potential buyers the following information:

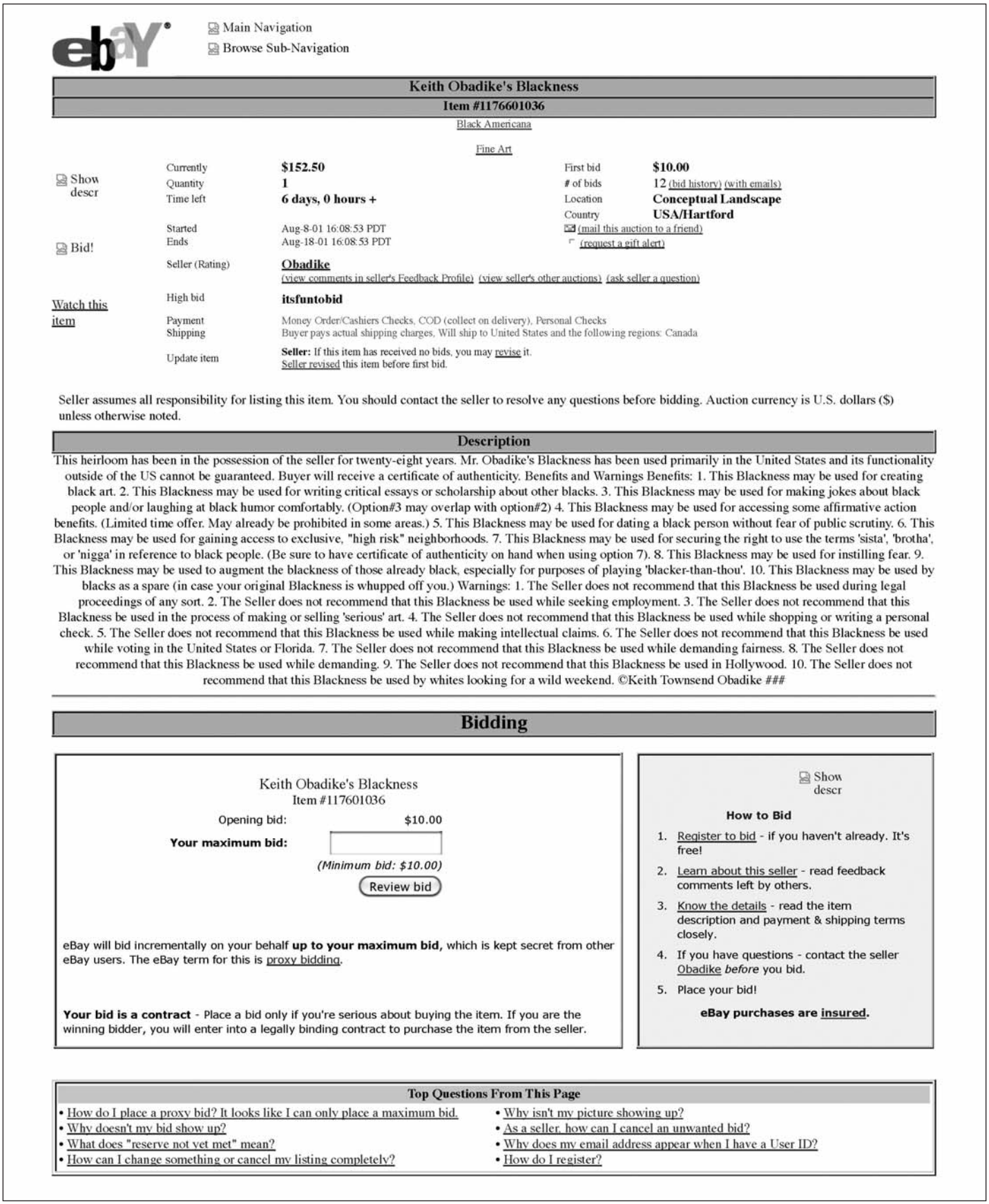
> Mr. Obadike's Blackness has been used primarily in the United States and its functionality outside of the US cannot be guaranteed. Buyer will receive a certificate of authenticity. . . . Benefits: . . . 2. This Blackness may be used for writing critical essays or scholarship about other blacks. 3. This Blackness may be used for making jokes about black people and/or laughing at black humor comfortably. . . . 4. This Blackness may be used for accessing some affirmative action benefits. (Limited time offer. May already be prohibited in some areas.) 5. This Blackness may be used for dating a black person without fear of public scrutiny. 6. This Blackness may be used for gaining access to exclusive, "high risk" neighborhoods. 7. This Blackness may be used for securing the right to use the terms 'sista', 'brotha', or 'nigga' in reference to black people. (Be sure to have certificate of authenticity on hand when using option 7.) . . . 9. This Blackness may be used to augment the blackness of those already black, especially for purposes of playing 'blacker-than-thou'. . . . Warnings: 1. The Seller does not recommend that this Blackness be used during legal proceedings of any sort. 2. The Seller does not recommend that this Blackness be used while seeking employment. . . . 5. The Seller does not recommend that this Blackness be used while making intellectual claims. 6. The Seller does not recommend that this Blackness be used while voting in the United States or Florida.[15]

The auction was held in August 2001 but was removed by eBay after only four days for inappropriateness. "Keith Obadike's Blackness" had attracted twelve bidders, and the highest bid was $152.50 when it was pulled.

Perhaps it does take an existentialist's black humor to make sense of race in America. ■

[14] Walter Mosley, "Poisonville," in *A New Literary History of America*, ed. Marcus and Sollors, 598 – 602; and Monica Miller, "'The Self-Respect of My People,'" in *A New Literary History of America*, ed. Marcus and Sollors, 852 – 856.

[15] Keith Townsend Obadike, "Keith Obadike's Blackness" (2001), http://obadike.tripod.com/ebay.html (November 12, 2009).



Main Navigation
Browse Sub-Navigation

Keith Obadike's Blackness
Item #1176601036

Black Americana

Fine Art

Show descr

Bid!

Watch this item

Currently	**$152.50**	First bid	**$10.00**
Quantity	**1**	# of bids	12 (bid history) (with emails)
Time left	**6 days, 0 hours +**	Location	**Conceptual Landscape**
		Country	**USA/Hartford**
Started	Aug-8-01 16:08:53 PDT	(mail this auction to a friend)	
Ends	Aug-18-01 16:08:53 PDT	(request a gift alert)	
Seller (Rating)	**Obadike** (view comments in seller's Feedback Profile) (view seller's other auctions) (ask seller a question)		
High bid	**itsfuntobid**		
Payment	Money Order/Cashiers Checks, COD (collect on delivery), Personal Checks		
Shipping	Buyer pays actual shipping charges, Will ship to United States and the following regions: Canada		
Update item	**Seller:** If this item has received no bids, you may revise it. Seller revised this item before first bid.		

Seller assumes all responsibility for listing this item. You should contact the seller to resolve any questions before bidding. Auction currency is U.S. dollars ($) unless otherwise noted.

Description

This heirloom has been in the possession of the seller for twenty-eight years. Mr. Obadike's Blackness has been used primarily in the United States and its functionality outside of the US cannot be guaranteed. Buyer will receive a certificate of authenticity. Benefits and Warnings Benefits: 1. This Blackness may be used for creating black art. 2. This Blackness may be used for writing critical essays or scholarship about other blacks. 3. This Blackness may be used for making jokes about black people and/or laughing at black humor comfortably. (Option#3 may overlap with option#2) 4. This Blackness may be used for accessing some affirmative action benefits. (Limited time offer. May already be prohibited in some areas.) 5. This Blackness may be used for dating a black person without fear of public scrutiny. 6. This Blackness may be used for gaining access to exclusive, "high risk" neighborhoods. 7. This Blackness may be used for securing the right to use the terms 'sista', 'brotha', or 'nigga' in reference to black people. (Be sure to have certificate of authenticity on hand when using option 7). 8. This Blackness may be used for instilling fear. 9. This Blackness may be used to augment the blackness of those already black, especially for purposes of playing 'blacker-than-thou'. 10. This Blackness may be used by blacks as a spare (in case your original Blackness is whupped off you.) Warnings: 1. The Seller does not recommend that this Blackness be used during legal proceedings of any sort. 2. The Seller does not recommend that this Blackness be used while seeking employment. 3. The Seller does not recommend that this Blackness be used in the process of making or selling 'serious' art. 4. The Seller does not recommend that this Blackness be used while shopping or writing a personal check. 5. The Seller does not recommend that this Blackness be used while making intellectual claims. 6. The Seller does not recommend that this Blackness be used while voting in the United States or Florida. 7. The Seller does not recommend that this Blackness be used while demanding fairness. 8. The Seller does not recommend that this Blackness be used while demanding. 9. The Seller does not recommend that this Blackness be used in Hollywood. 10. The Seller does not recommend that this Blackness be used by whites looking for a wild weekend. ©Keith Townsend Obadike ###

Bidding

Keith Obadike's Blackness
Item #117601036

Opening bid: $10.00

Your maximum bid:

(Minimum bid: $10.00)

Review bid

eBay will bid incrementally on your behalf **up to your maximum bid,** which is kept secret from other eBay users. The eBay term for this is proxy bidding.

Your bid is a contract - Place a bid only if you're serious about buying the item. If you are the winning bidder, you will enter into a legally binding contract to purchase the item from the seller.

Show descr

How to Bid

1. Register to bid - if you haven't already. It's free!
2. Learn about this seller - read feedback comments left by others.
3. Know the details - read the item description and payment & shipping terms closely.
4. If you have questions - contact the seller Obadike *before* you bid.
5. Place your bid!

eBay purchases are insured.

Top Questions From This Page

- How do I place a proxy bid? It looks like I can only place a maximum bid.
- Why doesn't my bid show up?
- What does "reserve not yet met" mean?
- How can I change something or cancel my listing completely?
- Why isn't my picture showing up?
- As a seller, how can I cancel an unwanted bid?
- Why does my email address appear when I have a User ID?
- How do I register?

Figure 5

Noteworthy

As of press time, several Fellows of the Academy, listed below, have been nominated to serve in senior roles in President Barack Obama's administration.

Cherry A. Murray (Harvard University): Member, National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling

Subra Suresh (Massachusetts Institute of Technology): Director, National Science Foundation

Harold Varmus (Memorial Sloan-Kettering Cancer Center): Director, National Cancer Institute

Select Prizes and Awards

J. Roger P. Angel (University of Arizona) was awarded the 2010 Kavli Prize in Astrophysics. He shares the prize with Jerry Nelson (University of California, Santa Cruz) and Ray Wilson (Imperial College London).

Carolyn Bertozzi (University of California, Berkeley) was awarded the 2010 Lemelson-MIT Prize.

Mina J. Bissell (Lawrence Berkeley National Laboratory) was awarded the 2010 American Italian Cancer Foundation Prize for Scientific Excellence in Medicine.

Norman Bradburn (National Opinion Research Center; University of Chicago) and **Norbert Schwarz** (University of Michigan) received the 2010 Book Award of the American Association for Public Opinion Research for *Thinking About Answers: The Application of Cognitive Processes to Survey Methodology.*

Stephen J. Elledge (Harvard Medical School) is the recipient of the 2010 Dickson Prize in Medicine.

Ruth Bader Ginsburg (Supreme Court of the United States) is the recipient of the 2010 American Bar Association Medal.

Michael Goodchild (University of California, Santa Barbara) was elected a Fellow of the Royal Society.

Linda Gordon (New York University) was awarded the 2010 Bancroft Prize, Los Angeles Times Prize for Best Biography, and National Arts Club Prize for Best Piece of Arts Writing for *Dorothea Lange: A Life Beyond Limits.*

Don Harrán (Hebrew University of Jerusalem) was named an honorary member of Associazione Italiana per lo Studio del Giudaismo.

Simon Levin (Princeton University) is the recipient of the Eminent Ecologist Award, given by the Ecological Society of America.

Gail Martin (University of California, San Francisco) is the recipient of the Federation of American Societies for Experimental Biology 2011 Excellence in Science Award.

Thom Mayne (Morphosis) was elected to the American Academy of Arts and Letters.

Bruce S. McEwen (Rockefeller University) was awarded the 2010 Foundation Ipsen Neuronal Plasticity Prize. He shares the prize with Donald W. Pfaff (Rockefeller University) and Thomas R. Insel (National Institute of Mental Health).

Bethany Moreton (University of Georgia; Academy Visiting Scholar, 2006–2007) is the recipient of the 2009–2010 Emerging Scholars Prize, given by the Institute for the Humanities at the University of Michigan.

J. Anthony Movshon (New York University) is the recipient of the 2010 António Champalimaud Vision Award. He shares the award with William T. Newsome (Stanford University).

Tim O'Brien (Austin, TX) is the recipient of the Katherine Anne Porter Award, given by the American Academy of Arts and Letters.

Eric Olson (University of Texas Southwestern Medical Center) was awarded the Fondation Lefoulon-Delalande Grand Prize for Science.

Stephen Pacala (Princeton University) is the recipient of the Robert H. MacArthur Award, given by the Ecological Society of America.

Julia Phillips (Sandia National Laboratories) was named a Material Research Society Fellow.

Richard Powers (University of Illinois at Urbana-Champaign) was elected to the American Academy of Arts and Letters.

Francine Prose (New York, NY) was elected to the American Academy of Arts and Letters.

Marilynne Robinson (University of Iowa) was elected to the American Academy of Arts and Letters.

James Rothman (Yale University) was awarded the 2010 Kavli Prize in Neuroscience. He shares the prize with **Richard Scheller** (Genentech) and **Thomas Südhof** (Stanford University School of Medicine).

Richard Scheller (Genentech) was awarded the 2010 Kavli Prize in Neuroscience. He shares the prize with **James Rothman** (Yale University) and **Thomas Südhof** (Stanford University School of Medicine).

Norbert Schwarz (University of Michigan) was elected to the German National Academy of Sciences Leopoldina.

Norbert Schwarz (University of Michigan) and **Norman Bradburn** (National Opinion Research Center; University of Chicago) received the 2010 Book Award of the American Association for Public Opinion Research for *Thinking About Answers: The Application of Cognitive Processes to Survey Methodology.*

Michael Sorkin (City College of New York; Michael Sorkin Studio) is among the recipients of the American Academy of Arts and Letters Awards in Architecture.

Thomas Südhof (Stanford University School of Medicine) was awarded the 2010 Kavli Prize in Neuroscience. He shares the prize with **Richard Scheller** (Genentech) and **James Rothman** (Yale University).

Andrew J. Viterbi (Viterbi Group) was awarded the IEEE Medal of Honor.

New Appointments

Willard L. Boyd (University of Iowa College of Law) was named interim Director of the University of Iowa Museum of Art.

Paul L. Joskow (Alfred P. Sloan Foundation; Massachusetts Institute of Technology) was named Chairman of the Board on Science, Technology, and Economic Policy (STEP) at the National Academies.

Roderick Little (University of Michigan) was named Associate Director for Statistical Methodology and Standards at the U.S. Census Bureau.

Walter E. Massey (Morehouse College) was appointed President of the School of the Art Institute of Chicago.

Thomas D. Pollard (Yale University) was appointed Dean of the Graduate School of Arts and Sciences at Yale University.

Select Publications

Poetry

Paul Muldoon (Princeton University). *Maggot.* Farrar, Straus and Giroux, September 2010

C. K. Williams (Princeton University). *Wait.* Farrar, Straus and Giroux, May 2010

Fiction

Sigrid Nunez (New York, NY). *Salvation City.* Riverhead, September 2010

Elie Wiesel (Boston University). *The Sonderberg Case.* Knopf, August 2010

Nonfiction

Benjamin H. D. Buchloh (Harvard University), Lynne Cooke (Museo Reina Sofía), Suzanne Hudson (University of Illinois at Urbana-Champaign), Susanne Küper (Berlin, Germany), and James Lawrence (*The Burlington Magazine*). *Blinky Palermo Retrospective 1964–77.* Yale University Press, October 2010

Chip Colwell-Chanthaphonh (Denver Museum of Nature and Science; Academy Visiting Scholar, 2005–2006), Stephen E. Nash (Denver Museum of Nature and Science), and Steven R. Holen (Denver Museum of Nature and Science). *Crossroads of Culture.* University Press of Colorado, May 2010

Charles Fried (Harvard Law School) and Gregory Fried (Suffolk University). *Because It Is Wrong: Torture, Privacy, and Presidential Power in the Age of Terror.* W.W. Norton, September 2010

Henry Louis Gates, Jr. (Harvard University). *Faces of America: How 12 Extraordinary People Discovered Their Pasts.* New York University Press, August 2010

Henry Louis Gates, Jr. (Harvard University). *Tradition and the Black Atlantic: Critical Theory in the African Diaspora.* Basic Books, September 2010

Roberto González Echevarría (Yale University). *Cuban Fiestas.* Yale University Press, November 2010

Linda Greenhouse (Yale Law School) and **Reva B. Siegel** (Yale Law School). *Before Roe v. Wade: Voices That Shaped the Abortion Debate Before the Supreme Court's Ruling.* Kaplan Publishing, June 2010

Don Harrán (Hebrew University of Jerusalem), ed. and trans. *Sarra Copia Sulam, Jewish Poet and Intellectual in Seventeenth-Century Venice: The Works of Sarra Copia Sulam in Verse and Prose Along with Writings of Her Contemporaries in Her Praise, Condemnation, or Defense.* University of Chicago Press, November 2009

David Harvey (The Graduate Center, City University of New York). *The Enigma of Capital: And the Crises of Capitalism.* Oxford University Press, September 2010

Kenneth T. Jackson (Columbia University), ed. *The Encyclopedia of New York.* Yale University Press, December 2010

Chalmers Johnson (Japan Policy Research Institute). *Dismantling the Empire: America's Last Best Hope.* Metropolitan Books, August 2010

Evelyn Fox Keller (Massachusetts Institute of Technology). *The Mirage of a Space between Nature and Nurture.* Duke University Press, August 2010

Bruno Latour (Institut d'Etudes Politiques). *On the Modern Cult of the Factish Gods.* Duke University Press, January 2011

Herbert S. Lindenberger (Stanford University). *Situating Opera: Period, Genre, Reception.* Cambridge University Press, October 2010

Martin E. Marty (University of Chicago). *Building Cultures of Trust.* Eerdmans, July 2010

Gustavo Pérez-Firmat (Columbia University). *The Havana Habit.* Yale University Press, October 2010

Judith Resnik (Yale Law School) and Dennis E. Curtis (Yale Law School). *Representing Justice: The Creation and Fragility of Courts in Democracies.* Yale University Press, December 2010

Condoleezza Rice (Stanford University). *Extraordinary, Ordinary People: A Memoir of Family.* Crown, October 2010

Reva B. Siegel (Yale Law School) and **Linda Greenhouse** (Yale Law School). *Before Roe v. Wade: Voices That Shaped the Abortion Debate Before the Supreme Court's Ruling.* Kaplan Publishing, June 2010

James Q. Wilson (University of California, Los Angeles). *American Politics, Then & Now and Other Essays.* AEI Press, June 2010

Commissions

Diller Scofidio + Renfro Architects (including Fellows **Elizabeth Diller** and **Ricardo Scofidio**) have been chosen to design the Berkeley Art Museum and Pacific Film Archive.

We invite Fellows and Foreign Honorary Members to send notices about their recent and forthcoming publications, scientific findings, exhibitions and performances, and honors and prizes to bulletin@amacad.org. ■

Remembrance *It is with sadness that the Academy notes the passing of the following members.* *

Vladimir Igorevich Arnold – June 3, 2010; elected to the Academy in 1987

David Harold Blackwell – July 8, 2010; elected to the Academy in 1969

Louise Bourgeois – May 31, 2010; elected to the Academy in 1981

Jacques Brunschwig – April 16, 2010; elected to the Academy in 2007

Emilio Quincy Daddario – July 7, 2010; elected to the Academy in 1970

Clement Alfred Finch – June 28, 2010; elected to the Academy in 1976

Robert Galambos – June 18, 2010; elected to the Academy in 1958

Paul Roesel Garabedian – May 13, 2010; elected to the Academy in 1963

Martin Gardner – May 22, 2010; elected to the Academy in 1997

Gerson Goldhaber – July 19, 2010; elected to the Academy in 1991

Moshe Greenberg – May 15, 2010; elected to the Academy in 1987

George W. Housner – October 10, 2008; elected to the Academy in 1991

Juanita M. Kreps – July 5, 2010; elected to the Academy in 1988

Hans Wolfgang Liepmann – June 24, 2009; elected to the Academy in 1960

Paul Georges Malliavin – June 3, 2010; elected to the Academy in 1996

Edward Archibald Mason – June 23, 2010; elected to the Academy in 1970

William Mitchell – June 11, 2010; elected to the Academy in 1997

Nancy Goldman Nossal – September 28, 2006; elected to the Academy in 2005

Fred Plum – June 11, 2010; elected to the Academy in 1998

Sigmar Polke – June 10, 2010; elected to the Academy in 2008

William Rubin – January 22, 2006; elected to the Academy in 1985

Norman Burston Ryder – June 30, 2010; elected to the Academy in 1977

Philip Selznick – June 12, 2010; elected to the Academy in 1961

Marshall Darrow Shulman – June 21, 2007; elected to the Academy in 1963

Charles Edward Stearns – June 27, 2010; elected to the Academy in 1959

Bert Lester Vallee – May 9, 2010; elected to the Academy in 1963

Milton Denman Van Dyke – May 10, 2010; elected to the Academy in 1975

James Nowell Wood – June 11, 2010; elected to the Academy in 1997

* Notice received from May 14, 2010, to July 22, 2010

Lumbar Enlargement of the Spinal Cord

In 1860, the same year that he graduated from Harvard Medical School, Dr. James Dean communicated a paper on "The Lumbar Enlargement of the Spinal Cord" to the Academy through his colleague Dr. Jeffries Wyman. As he states in the opening of his communication: "I propose, in the following paper, to notice a few points in regard to the structure of the spinal cord, confining myself chiefly to a description of the course of the fibres forming the nerve-roots, as they pass through the white and gray substances to their final union with nerve-cells, discussing somewhat at length the relation which nerve-cells and fibres sustain in the cord." His communication was published in the Academy *Memoirs* in 1861 (vol. 8, no. 1) and was his first major publication.

In Dean's obituary in the *Boston Medical and Surgical Journal* he was referred to as "the pioneer in American microscopic studies of the structure of the central nervous system." Dean (1831 – 1888) was elected to the American Academy in 1862.

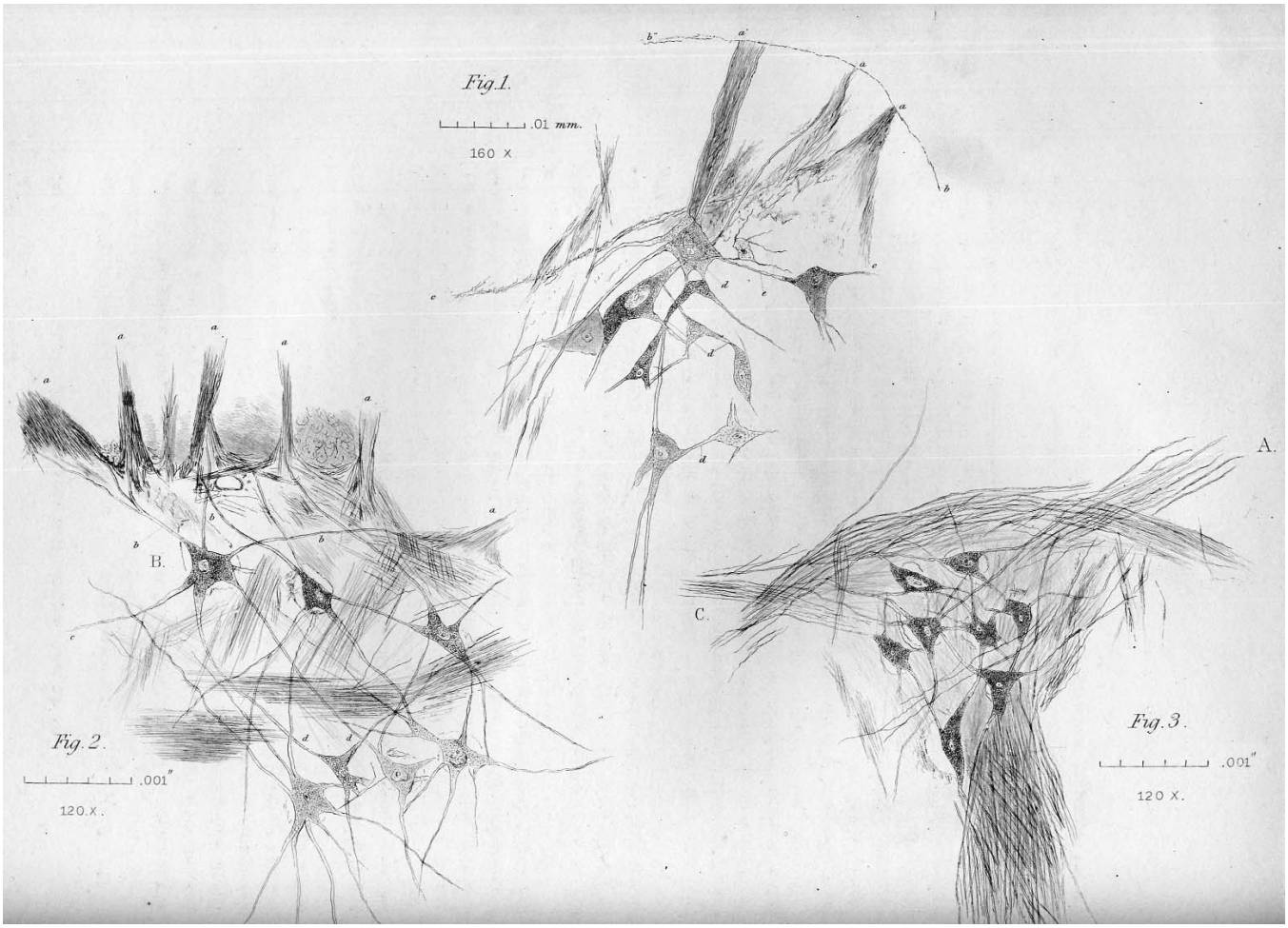


Figure 1. Transverse section representing part of the anterior cornu, from the lumbar enlargement of the rabbit.

Figure 2. Group of cells from the anterior cornu of the sheep, connected with the radiating bundles from which the longitudinal fibres of the white substance are derived.

Figure 3. Group of cells from the anterior cornu of the sheep, connected with the anterior roots at A.

Dean drew all the figures himself, by means of the camera lucida, and then etched them onto copper.

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