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# Carnegie REPORTER

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# Literacy Plus Math and Science: *An Equation for American Progress*

*by* Vartan Gregorian, *President, Carnegie Corporation of New York*

PHOTO BY MICHAEL FALCO

In our nation, which stretches, as one of our most beloved anthems notes, "from sea to shining sea," we have a fondness for thinking big and for doing big things. Usually, this is a great benefit to our national life because we celebrate big ideas, big vistas, big acts of both charity and philanthropy, and big projects that provide social benefits such as job creation or neighborhood renewal. In that connection, we also have a kind of national obsession with superstructure: the 24/7 news cycle that is available to all of us (or perhaps I should say, that is sometimes inflicted on us) through a multitude of media including cable television, radio, and the ubiquitous Blackberry, often focuses on government, education, social and cultural issues writ large. "The Right" versus "The Left," for example, or the "red" states versus the "blue" ones. Liberals versus conservatives. Urban versus rural. The larger the concept, it seems, the easier it is to argue about, often in shrill and divisive terms.

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One of the problems with focusing on "superstructure" issues is that we tend to neglect the essential *infrastructure* of our nation: the systems and institutions that most people interact with every day of their lives and that are the real pillars of our democracy. Those include, of course, our educational system, because it is in the elementary and secondary school grades that students begin to deeply engage with and acquire the knowledge and skills they will need to become the next generation of American leaders. As long ago as 1983, the National Commission on Excellence in Education famously warned that we were falling behind in carrying out this critical task, noting "...[T]he educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people." In the quarter century since then, efforts have been made to repair the damage, but it remains clear that our K-12 system of schooling continues to be in serious need of upgrading, improvement and reorganization. In short, it is time to "do school differently" for the more than 49 million American students enrolled in public school—not to mention the over 6 million attending private schools.

Ensuring that American education is rooted in excellence and uncompromising in its promise to provide access to all students has been a long-standing goal of the Carnegie family of more than 20 organizations and institutions. In particular, since the beginning of the last century, Carnegie Corporation of New York and its U.S.-based sister organizations, including the Carnegie Institution for Science, the Carnegie Endowment for International Peace, Carnegie Mellon University, The Carnegie Foundation for the Advancement of Teaching, and the Carnegie Council for Ethics in International Affairs, have been dedicated to helping advance American education and the world of ideas. Carnegie Corporation itself has a long history of convening and supporting study groups and commissions charged with delving deeply into how the quality of teaching and learning in our K-12 school system, as well as in our colleges and universities, impacts the strength of our nation and our democracy. The importance of keeping a national spotlight on this issue was perhaps best expressed by the great education reformer Horace Mann, who believed that "education is the engine of democracy." From the Carnegie Commission on Science, Technology, and Government to the Carnegie Task Force on Learning in the Primary Grades to the Carnegie Task Force on Meeting the Needs of Young Children to the recently launched Carnegie Corporation-Institute for Advanced Study (IAS) Commission on Mathematics and Science Education, the Corporation has concentrated much of its resources on efforts to enrich and improve education because, without high-

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# Carnegie REPORTER






## A Note About This Issue

There is a new look to the Carnegie Reporter as it marks its first decade—that is Andrew Carnegie's signature on our masthead as we reach this important moment in history: Carnegie Corporation's Centennial.

For 100 years the Corporation—the name Andrew Carnegie gave his grantmaking foundation after he had bestowed names like "foundation" and "endowment" on other institutions he created—has taken Mr. Carnegie's challenge and thought big.

To prepare the foundation for its next century, it seemed right to go to our roots, to unveil the handwriting of our founder, Mr. Carnegie himself. The Corporation has never had one of those marketing tools called a logo; its name alone was all it needed. But in the age of the Internet, visual identity is considerably more important in communicating the values and principles of an organization.

Our new identity combines Mr. Carnegie's handwriting with a modern, bold definition of our institution's name, positioning us to unlock our legacy, not by looking backward but by moving forward with conviction.

In the century since Mr. Carnegie endowed the Corporation with $135 million, our mission has remained constant. We continue to focus on his passions—education and the need for international understanding and peace—in an effort to make the world a better place. Mr. Carnegie was a champion of the progressive era's conviction that with education comes understanding, that knowledge is a good that can transform the world. Under President Vartan Gregorian, the Corporation's work is more contemporary, focused on today's pressing issues, but the values are much as they were in 1911: armed with knowledge, men and women can make decisions that can better society.

The Corporation has always focused on ideas—ideas that can make profound changes in lives, in institutions and in society. And this magazine serves as a hub for those ideas, where we can share with others the ideas our program officers are exploring.

The cover story of this issue focuses on the Carnegie-Knight Initiative on the Future of Journalism Education, a partnership with the Knight Foundation to promote innovation and serious journalism that can serve democracy.

Can Islam and science co-exist? Our Islam Initiative focuses on understanding old and new interpretations of Islam. Our story focuses on a new university in Saudi Arabia whose programs will also explore these questions.

Education reform has been stymied in recent years by an inability to compare student learning across the country where testing varies greatly. In a major leap forward, there is a growing belief that common standards will help improve teaching and student outcomes. We look at this moment of change in school reform and review the Corporation's recent Commission focused on math and science.

The Corporation's concern with nuclear security led our International Program to study nuclear energy and its role in containing the nuclear genie. Our deep dive into the issue explores the promise and problems with the nuclear renaissance.

As we enter the Centennial year, buoyed by the legacy of a hundred years of investing in ideas, we are humbled and recommitted to doing what Mr. Carnegie charged us to do: "real and permanent good in this world" and to do it "in perpetuity."

SUSAN KING, *Vice President, External Affairs and Program Director, Journalism Initiative, Special Initiatives and Strategy*

PHOTO BY DEANNA DENT

# News21:

## Are Next-Generation Journalists the Future of a Profession in Transition?

*by* Christopher Connell

It's 7:35 a.m. on the beach in Lincoln City, Oregon, and the mellifluent Roger Robertson, morning host on KBCH AM 1400, is on the air with "a couple of young gentlemen" who have come a great distance. "News21 is the program that they are with. Phil and Andrew, you guys are from where?"

"Roger, we are coming here from Syracuse, New York," replies Phil Tenser, a freshly minted broadcast journalism graduate from Syracuse University.

"On purpose?"

"On purpose, yeah," says Tenser. "We're here to study youth and technology as part of a national project. We are sponsored by the Knight Foundation and Carnegie Corporation. We are trying to study youth and technology and tell the stories in ways that will also help inspire the future of journalism." That may sound presumptuous for someone ten days out of college, he allowed, but given the parlous state of the economy and the news business, "you can't avoid it."

Tenser and partner Andrew Burton aren't just being interviewed. They are filming Robertson and the KBCH studio with a flip cam and taking photographs, all the while soliciting listeners to contact them with stories. Before the sun sets over the Pacific, they will have posted on the Internet a blog, pictures, video and sound from their 25 minutes on air with the Larry King of this stretch of coastal Oregon. And they were not alone. They were part of a larger army of 93 News21 fellows who fanned out across the country from eight campuses with high def cameras, sound recorders, laptops, iPhones and other devices in search of that elusive future for their beleaguered profession.

News21 is a multi-million dollar experiment by Carnegie Corporation of New York and the James S. and John L. Knight Foundation to determine if these next-gen journalists can awaken interest in news where their elders have failed, and to do so first by studying in depth important issues—liberty and security; the role of religion in American life; the country's dramatically changing demographics—and then spin out stories with all the multimedia tools that the digital age has to offer. Their work can be viewed at www.news21.com.

A crippling recession has created further hardships for an industry that was already in a tailspin. Venerable newspapers such as the *Rocky Mountain News* and *Seattle Post-Intelligencer* have folded, and big city dailies from Los Angeles to Minneapolis to Chicago to Philadelphia to Hartford are in bankruptcy. Tens of thousands of reporters and editors have lost their jobs. News operations that closed foreign bureaus to pinch pennies now are retreating from covering the nation's capital. The august *New York Times* had to sell both classical radio station WQXR and its glittering, new skyscraper to keep the wolves at bay. News magazines struggle with their own anorexia, while entertainment news and vituperation dominate the airwaves.

## Elevating Journalism's Place in the Academy

A profound belief that democracy cannot thrive without good journalism initially led Carnegie Corporation President Vartan Gregorian and Vice President Susan Robinson King to reach out to journalism deans and presidents of five leading universities—Columbia University, Harvard University, Northwestern University, the University of California, Berkeley, and the University of Southern California (USC)—to consider how to bolster the education and practice of journalism. Later the Knight Foundation joined the effort, and the Carnegie-Knight Initiative on the Future of Journalism Education was formally launched in 2005. By revitalizing the curricula and intellectual quotient at journalism schools, they sought to ensure that a new generation of well-trained reporters, editors, producers and ultimately news executives would rise up to sustain the media's role as democracy's watchdog. Not incidentally, the deans also hoped to win new respect for their schools within the academy and from the industry that hires their graduates.

Their principal tool for gaining this leverage would be News21, a summer laboratory showcasing the talents of their top students. The deans of the four journalism schools and the director of Harvard University's Joan Shorenstein Center on the Press, Politics and Public Policy would select the summer's topic a year in advance, and each journalism school would arrange a seminar for fellows to study that issue in depth, with faculty drawn from across university disciplines. The fellows—ten from each journalism school and four from Harvard's John F. Kennedy School of Government—would be paid $7,500 stipends to report and produce their stories over an intense ten weeks on the road and toiling on campus under the guiding hand of faculty and professional editors and web designers.

The number of fellows doubled in the summer of 2009 after seven more top tier journalism schools were welcomed into the News21 tent. Newsrooms were opened at Arizona State University, the University of Maryland, the University of North Carolina and Syracuse University, while the three other newcomers—the University of Missouri, University of Nebraska and University of Texas—joined Harvard in contributing fellows to the eight test beds.

## Emphasis on Innovation

From the start, the News21 fellows have faced two daunting challenges: to come up with stories of national importance and to tell them in ways that break the mold of traditional news media. The deans regarded innovation and invention as the higher priority. "The experimental was the most important side of this. Otherwise, it was just a really rich, pleasant internship program," said Alex S. Jones, the Shorenstein Center director. Geoffrey Cowan, former dean of the Annenberg School at the University of Southern California, said he envisioned News21 as the journalism school equivalent of an engineering school laboratory, only this one "would be about inventing what journalistic storytelling could be like."

Former Berkeley journalism school dean Orville Schell, another of the original deans, had a practical objective in mind, too. He was dismayed at the paucity of openings in the broadcast news business—a particular strength of Berkeley's—and believed News21 could help fill that void. "I'd been sitting at too many meetings where people lamented that the serious media were melting away before their eyes," said Schell, now Arthur Ross Director of the Asia Society's Center on U.S.-China Relations. "There were big gaps in the journalistic food chain, like a salmon run with no salmon ladders."

Knight Vice President Eric Newton coined the moniker for the experiment. News21 is short for News for the 21st Century: Incubators of New Ideas. These would be stories reported and told in 21st century ways—such as using Adobe Flash to stream audio, video and slide shows—and the storytellers themselves were mostly 20-somethings, speaking

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to their own generation, accustomed to getting news online, not from newspapers, and tuned more to *The Daily Show with Jon Stewart* and the *Colbert Report* than to the nightly news or *Meet the Press*. Back in 2005, some news leaders thought all the talk about how the digital revolution would transform the industry "was crazy, but if you look at where we are today, we weren't crazy enough," said Newton. "We were moving in the right direction, but no one had an appropriate sense of urgency." USC's Cowan observed, "We didn't know that old journalism would collapse, but we knew how important new journalism would be."

The deans had chosen as News21's first topic the difficult balance in post-9/11 America between keeping the country safe and protecting civil liberties. While all pursued stories clustered around that theme, the fellows at the different test beds did not then and have never since functioned as a single army under joint command. Cowan, one of the framers, had expected that they would operate as one large investigative unit, à la the students that Ralph Nader attracted to Washington for his "Nader's Raiders" exposés.

The 2006 fellows scored remarkable successes in getting their stories in major newspapers and on national television broadcasts. They landed a string of big stories about privacy and security in *The New York Times* and the Associated Press as well as on the PBS *NewsHour with Jim Lehrer* and CNN's *Anderson Cooper 360°*. The Columbia fellows followed the money trail from the post-haste creation of the Department of Homeland Security. Northwestern's Laura McGann made headlines with an exposé on how the FBI was sifting through college students' financial aid records. Other fellows from Northwestern's Medill school produced eye-catching reports on how government and industry digitally tracked citizens' digital transactions. The USC Annenberg fellows examined the social impact of stepped-up enforcement of immigration laws. And the Berkeley fellows sent four teams of reporters around the world to capture glimpses of the everyday lives of young soldiers and sailors serving in U.S. peacekeeping missions in Djibouti on the Horn of Africa, at bases across the Middle East, in the former Soviet republic of Kyrgyzstan and near the demilitarized zone in South Korea. *Anderson Cooper 360°* devoted a full hour to the documentaries produced by three of Berkeley's teams.


**An early version of the News21 homepage for 2009.**

Bob Calo, a Berkeley senior lecturer who directed its News21 newsroom in 2006 and 2007 and was the national director in 2008, remembers telling his graduate students not to approach their interview subjects like some "network fancy pants," but as peers. "We wanted to do a narrative experiment and come up with a fresher and different way to report on the military. Most of the soldiers serving in places like East Africa and Kyrgyzstan are young and so was my staff of reporters," said Calo, a veteran television news producer. "Instead of having that Ted Koppel conversation—'Young man, where are you from and how do you feel?'—these were 27-year-olds looking at each other across a cultural divide."

## From News21 to Newsweek

Katie Connolly, a fellow from Harvard, was on the team that journeyed to South Korea to report on how efforts to downsize and transform the U.S. military were playing out on the peninsula. "Bob Calo really emphasized innovation to us," she said. "That was in the forefront of our minds: how do we tell the story in a way that *The New York Times* wouldn't?" Connolly, a trade policy wonk from Australia, wasn't thinking about journalism when she enrolled at the Kennedy School. But she caught the bug from News21, landed a job at *Newsweek* and spent all of 2008 on the campaign trail covering

John McCain. Connolly, now a political reporter in *Newsweek*'s Washington bureau, said, "I came back from News21 thinking, 'This is the coolest job ever. You get to talk to interesting people and learn about fascinating topics and go to really cool places.'"

She also learned how to "craft an interesting narrative out of a boring policy topic like military transformation...It was actually the knowledge component that has been the most useful for me because I am a print journalist now, not a multimedia journalist. All the stuff I learned was fun and great, but I haven't had to use a video camera or Flash or anything like that since."

Aliza Nadi and Cerissa Tanner, who followed the rock band Hello, Dave, on a USO tour across the Middle East, became TV news producers at *Dateline NBC* and *Current TV*. Nadi said, "News21 was a fantastic opportunity to go beyond what we learned in grad school, take risks in our storytelling, experiment in our style, and brand a type of journalism that's raw, intimate, and transparent." Tanner said the experience allowed her "to develop my own distinct voice and brand of storytelling." She added, "The fact that *Anderson Cooper 360°* aired my documentary the month I entered the job market looked pretty friggin' hot on my resumé," said Tanner.

Although the liberty-vs.-security stories impressed mainstream media editors and producers, those same packages elicited a collective ho-hum from the internet *avant garde*. One such verdict came from Mark Glaser, executive editor of MediaShift, a PBS blog and web site that bills itself as "Your Guide to the Digital Media Revolution." Glaser opined in August 2006: "From what I've seen so far, the fellows have done some great investigative work on topics such as digital data trails and life in the military abroad—but I wonder whether they are doing really cutting-edge, innovative work that will live on beyond the annual program." The fledgling News21 web site, he added, was "clunky."

Patricia Dean, associate director of the USC journalism school, said the work that first summer "wasn't as multimedia because the world wasn't as multimedia then." Calo observed, "We showed we were capable of doing mature reporting that would be valued nationally and locally. Where we didn't succeed was having those people focused on the digital future saying, 'Wow! You blew our minds.'"

## Religion in America—and Tattoos

In each of the following three summers, the News21 stories would be presented in ever deeper and more complex multimedia packages designed to attract eyes on the web. But as the work moved closer toward the cutting edge, it also became harder for newspapers and networks to run the stories or even adapt them for their web sites. The religion topic that the deans chose for 2007 wasn't one "that lent itself to breaking big stories," said Merrill Brown, News21's first editorial director, "but it did lend itself to creative, multimedia storytelling, and we did a way better job at that in year two." Traffic to the News21 web site tripled to three million page views.

One Medill feature practically went viral: a multimedia look at tattooed Christian rock fans who advertise their beliefs with vivid body art. Fellows Brad Flora and Ben Helfrich found their subjects at Cornerstone, an annual religious concert and happening on 500 acres of farmland in central Illinois. Medill's Mrinalini Reddy eventually got a freelance follow-up feature in *The New York Times* on her story about how television sitcoms were shattering stereotypes about Muslims with series like Canada's *Little Mosque on the Prairie* and a U.S. show, *Aliens in America*. Columbia's fellows journeyed to India over spring break with professor and religion writer Ari Goldman and returned to examine how immigrants were finding ways to practice their faiths in America, from Buddhists and Baha'i to the Mandeans, adherents of an ancient Gnostic religion. Berkeley produced a "Moral Compass," a roulette-wheel-like web graphic that spun out answers to where nine major religions stood on questions of sex and morality. Their "God, Sex and Family" package also mapped states with the fewest abortions (Idaho), the most divorces (Arkansas) and other values-laden distinctions. USC fellows followed seekers of spirituality off beaten paths to Mount Shasta and to a dome in the California desert where tourists lie down to listen to soothing "symphonies" played on crystal bowls.

MediaShift's Glaser said News21's web site and multimedia were much improved in 2007 and he applauded the replacement of "the traditional objective journalism structure...with a more personal tone and narrative." But, he said, "there's still the nagging problem of fellows trying to engage online communities in a subject—and then abandoning the project as they leave the program each fall."

With the wide-open race for the White House and the likelihood that the Democrats' standard bearer would be either the first African-American or the first female nominee, the deans' choice of the elections as the topic for 2008 was an obvious one. But it posed a new challenge: with the blanket coverage in the major media, it would be hard for the fellows to get a word in edgewise with their reporting. Columbia journalism dean Nicholas Lemann defends the

CHRISTOPHER CONNELL

**University of Maryland News 21 Fellows Shauna Miller and Andrew Smith (R) prepare to videotape an interview with Rich and Malynda Madzel (L) on the topic of interracial marriages in the common room of a condominium in Columbia, Maryland**

choice. "A national election is a huge, huge, huge thing," he said, and many races and issues below the top of the ticket are inadequately covered. "My thought was, let's not be perverse and not cover this very important and consequential election that all our students are dying to write about—but let's not send them to cover the Democratic National Convention, either." But web traffic slumped, few stories found a second life elsewhere, and a partnership with National Public Radio yielded little. Again, most stories were geared for the web, which made them harder for traditional media to pick up. "The bigger commitment you made to innovation, the harder it was to distribute a lot of stories because you stopped doing traditional nuggets of content," said Calo. "We weren't producing television segments per se. Everything was cross platform, linked together and integrated into the web. You could do quality work, but it wasn't as easily parceled out to mainstream media partners." And to Calo, pushing forward on that front was more important "than getting our heads patted by mainstream media."

## Expanding and Extending the Initiative

The funders and the founding deans always planned to bring other top journalism schools into the initiative; Berkeley was the lone public university in the original gang of five. Six of the seven added for the second phase were large, public institutions. Arizona State University (ASU) and its Walter Cronkite School of Journalism and Mass Communication, newly ensconced in downtown Phoenix, were to become the new base of operations for News21 (Berkeley had been the administrative base for the first three summers). Calo and ASU dean Christopher Callahan crafted a proposal in 2008 that secured an $11 million commitment from Carnegie Corporation and the Knight Foundation to support the expansion of News21 and to extend the experiment for three more years. They argued that the case for it was still compelling:

> *The Initiative sought to address central issues at the intersection of public journalism and journalism education. Among those issues were the disconnect between traditional journalism and millions of younger Americans, a general malaise and uncertainty inside the profession...and the extreme disturbances in the media industry due to quickening technological change. There was also a notion that among the nation's top graduate schools of journalism, there was a window of opportunity to lead: they possessed an already built infrastructure for media production, a cadre of the nation's most talented young reporters, and faculty members all too aware of the parlous state of American journalism.*

The News21 experiment, they said, "could offer solutions and strategies to an increasingly jittery profession," while at the same time allowing the journalism schools to improve their curricula. They said News21, which had gotten by with a part-time director in its first two years, would hire a full-time director and web site programmer to turn the experiment into "a live, vibrant, year-round enterprise" with "a nationally recognized news site." While each school and dean would retain autonomy over its work, the national coordinator "would serve as the editor/publisher of the overall site" and seek to foster closer collaboration and a more "cohesive" product.

Callahan turned to Jody Brannon, a veteran editor at Microsoft's msn.com, USAToday.com and washingtonpost.com, to fill those shoes. Brannon also had academic credentials, having earned a Ph.D. at the University of Maryland's Merrill School with a dissertation that examined online journalism by major media. The deans chose the changing U.S. demographic tapestry as the topic for 2009, and Callahan and Brannon sought to get the eight incubators off to a faster start by bringing 39 fellows and a score of

advisers to Phoenix in early April to share ideas and be tutored in digital storytelling techniques.

### "News21 Needs to Go Far Beyond That"

In the tradition of Knight's Eric Newton, who puckishly told a News21 gathering in 2008 that their task was "to think about new forms of truth-telling...in a totally new technological era, and create some innovations that will help keep the human race from destroying itself. No pressure," Callahan told the fellows that they "really need to dream."

"If what you accomplish at the end of the summer is having produced fantastic stories that are really interesting and really important and really matter and have never been told before and you get them published in the *Washington Post* or *The New York Times* or the *Los Angeles Times*—if that's what we accomplish this summer, we fail. We fail miserably," he said. "News21 needs to go far beyond that."

In an interview, Callahan explained, "What I was trying to get across in a not so subtle way was that this project needs to be more than great journalism done in a traditional way, because the reality is that Carnegie Corporation and the Knight Foundation could take those resources and invest them in *The New York Times* or NBC News or the *Washington Post* or *Time* magazine to do great journalism. This needs to be something more." That something more, he added, "is taking advantage of an incredible smart group of young people who think differently about news" and who are capable of coming up with new ways to keep the public informed.

News21's lofty aspirations can give pause to even its most seasoned participants, the faculty. Susan Rasky, a Berkeley senior lecturer and former

# Blogs, Videos Catch Journalism Experiment As It Happens

*Jody Brannon, national director of News21, exhorted this year's 93 fellows to chronicle their work in progress through blogs, Twitter, video, audio and contributions to a Ning (a digital bulletin board for these "next-gen journalists"). Here are vignettes from those blogs as well as their responses to questions posed by e-mail by Christopher Connell.*

**JENNIFER WARD, Syracuse University**

Jennifer Ward is a triathlete, foodie and aspiring reporter from Winnipeg, Canada. In a videoblog last winter, she likened the News21 experiment to preparations for a difficult race. Speaking over soft music and a slideshow of her warming up in the snow, Ward said: "I look at it as if we are a bunch of people new to the sport of running. We're trying to figure out which shoes to buy, what the proper form is, the pace that's right for everyone...I definitely feel a bit of that same trepidation and excitement."

Ward and fellow Mary Buttolph, a photographer and environmentalist, spent weeks in Nixa, Missouri (an "evangelical epicenter") and Eagle, Colorado (a "boom town") pursuing stories about teens and technology. The pair explored how the evangelical church culture met technology in Nixa. All the churches they visited had web sites, and one pastor took text messages from congregants during services.

**May 22. Our days in this persistently sunny town have been spent meeting pastors, visiting schools, and barging in on youth events. Last night we were invited into the home of one of the area youth pastors, where we promptly derailed their discussion on the Gospel of Luke.**

In Eagle, Colorado, Ward voiced frustration about hitting dead ends and coming up empty in their search: "That's what's hard about this project: you can have 15 interesting conversations, and yet not a single compelling story idea will emerge." But they also were met with kindness and help from former strangers. "It's amazing how people start caring about what two random journalists are doing in their town."

**MAURA WALZ, Columbia University**

Walz focused on multimedia reporting while earning a master's degree. Her News21 team traveled to Minnesota to look at the growth of ethnic charter schools. She responded by e-mail to a question about balancing innovation and good journalism.

**I don't believe that most innovations have come because someone wanted to be "innovative"...[They] come about because someone is trying to solve a problem, because they want to do something that they can't do right now. Someone wanted an easier way to share videos, and now we have YouTube. Somebody else wanted an easier way to find out who the cute girl in his calculus class was and meet her, and now we have Facebook. Of course those things have expanded far beyond that as people figured out they could use those tools for other purposes, but the core of the innovation was figuring out a way to solve a problem.**

**I'm not sure that News21 had a specific enough problem that we wanted to solve or process we wanted to improve...[T]he most concrete goal I had was to do great journalism and tell the stories in compelling ways using multiple mediums and new tools.**

**SARA PEACH, University of North Carolina**

Sara Peach was an environmental activist before returning to her alma mater for a master's degree in journalism. She doubled as reporter and editor-in-chief for UNC's project looking at how the country can slake its growing thirst for energy. Peach first wrote an introductory blog titled "Powering the journalism of the future."

**Welcome to an experiment. This summer, I'm working with a team of reporters to develop new ways of telling stories online...**

**How can we involve our audience? How can we be more transparent? How can audio, video, 3-D graphics and Facebook applications expand the reach and power of our stories—or become the stories themselves...We welcome you as a fellow experimenter in the journalism of the future.**

**BRAD HORN, Syracuse University**

Brad Horn enrolled in graduate school with experience as a documentary filmmaker. His first video blog for News21, shot on a snowy Syracuse street last winter, used music, cutaways and split screens and made clever use of questions written on scraps of paper as storyboards.

**This project is the future of journalism, right? So what are we doing? We're doing youth and technology...What does it mean to live a modern life? Some sort of personal Internet device attached to your hip all the time? And what does it mean to be able to see and talk to people on other continents? How does that change the way people live?... Often in student projects the broader world doesn't care about them. My hope is that we can create something that people actually want to be part of...and something that touches hearts.**

Horn and Melissa Romero went to El Mirage, Arizona, a town with a large immigrant population, and visited a family of ten who shared a single lap-

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chief congressional correspondent for *The New York Times*, said, "You go to bed at night thinking, 'Oh, my God! They are not really innovating. They're just figuring out how to do what's already been done,' and 'Oh, my God, the reporting is only half as deep as I want it to be because they don't have [enough] time to report and produce.'"

Brannon made the rounds of the eight newsrooms over the summer. When she visited Columbia in early July, several fellows remarked on feeling overwhelmed. Not to worry, the director assured them; everyone felt that way.

While News21 was originally for graduate students only, 16 of the 2009 fellows were undergraduates, including half those selected by Syracuse University's Newhouse School. Steve Davis, the chair of newspaper and online journalism and News21 executive director, confessed in a telephone interview a few weeks from the finish line to feeling that "we probably didn't push the envelope enough...[and] ended up being a little more traditional than we wanted." In hindsight, he said, Syracuse asked its fellows to do too much as they went out to 11 prototypical communities that the *Christian Science Monitor* had earlier selected for its "Patchwork Nation" reporting project. Newhouse students regularly go on reporting trips around central New York during the school year, but News21 was like no other assignment, Davis said. "They were very excited about it, to tackle a story as a team and spread out around the country. Part of the whole News21 thing is to have [that] experience and do something that you otherwise wouldn't have the opportunity to do."

## Building a "Piece of the Future"

News21 has served as a springboard into the profession for many. Former fellows can be found at major news organizations (AP, *NewsHour with Jim Lehrer*, *Newsweek*) as well as start-ups. Brad Flora, the lead reporter on Medill's Christian tattoo project, is the founder, editor and publisher of *The Windy Citizen*, a free, online news site that aggregates local Chicago news and encourages Chicagoans to submit their own stories, videos and photos and rate what interests them most. Flora said his site has attracted 70,000 visitors a month. "There's lots of talk about the future of journalism," he said. "I'm actually building a little piece of this future here in Chicago."

Laura McGann, who exposed the FBI's snooping through student financial aid records, is editor of the *Washington Independent*, an online investigative news site. She called News21 "the most important part of my formal journalism education...[It] offered me a chance to do the kind of reporting that young reporters just don't normally get to do."

Most other former fellows contacted spoke highly of News21, although some were disappointed that their stories did not get picked up by mainstream media. That may change now under Brannon, who told the Columbia fellows, "My role as national director is to ensure that the whole world sees your journalism and hopefully offer it to enough media partners that they'll want to run your stuff on their sites or in their publication or on their television show... Everyone's thirsty because they see great, excellent, free copy."

Indeed, the success of Pro Publica, a nonprofit investigative reporting organization bankrolled by two philanthropists who made their fortune in the savings and loan industry, demonstrates just how thirsty news organizations are. *The New York Times*, the *Washington Post*, CBS's *Sixty Minutes* and others all have collaborated with Pro Publica's well-paid staff of investigative reporters. In an earlier era, big newspapers might look down their nose at reporting done by student journalists. But in the Internet era, they ignore it at their peril. Thanks to the web, "you can now do actual journalism without having to have a media partner, and then go and find your

CHRISTOPHER CONNELL

**2009 Columbia University News 21 Fellows with (in middle front) Managing Editor Adam Glenn, National Director Jody Brannon, and Associate Professor and News21 Editorial Coordinator LynNell Hancock. Carey King, the Columbia newsroom manager, is at far right.**

Continued from page 7

media partner later, or not at all," said Knight's Newton. "It gave impetus to this notion that the students could not only join together and be an investigative force larger than what nearly all news organizations can muster, but a force that could be creative in figuring out new ways to display and disseminate this news."

## No Monopoly on Experimentation

But this also raises another challenge for News21. It is far from the only entity practicing experimental journalism. As riots in Tibet and Xinjiang, China, and election protests in Iran demonstrated, ordinary people are using cell phone cameras and Twitter to broadcast their own news around the world.

"The web has very low barriers to entry," said Columbia's Lemann. "You get lots and lots and lots and lots of people trying web journalism in every possible way, shape and form. That's nice. It's a period of very vigorous experimentation, some at News21, some in start-ups and individual news outlets, some inside big news organizations. There are thousands of these things going on. It's nice to have News21 as part of this general feeling of experimentation." But, he added, "I can't look you in the eye and say News21 rises above all else as the most significant experiment in innovation in journalism."

Still, News21 has provided a jolt of energy that has surged through the faculty and curricula at the country's top journalism schools. "The unexpected pleasure of News21 is that it's helping to reform faculty as well, getting them tuned up," said Berkeley's Calo. Leslie Walker, the Knight Visiting Professor in Digital Innovation at the University of Maryland and former *Washington Post* columnist and editor of washington-

top computer. Horn let the camera roll for two hours as kids and parents cycled on and off the laptop.

**June 29. El Mirage. Woe unto you if you ever decide to set up a video camera in a room full of kids under 15-years-old...I had to say 'Get away from the camera!' about every 10 minutes. All the poking and prodding of the poor camcorder. I think someone even kissed the lens. But when I sat down to edit the tape it wasn't the typing and the MySpacing and the clickety-clacketing that made this video what it is. It's the kids... Thank god they didn't listen to me.**

In another blog, Horn told of meeting a 16-year-old who "has gone digital native" since moving to Arizona from Mexico five years ago.

**When I told him and his family about Skype—thinking I was being all Mr. Cutting Edge, 21st Century Man—as a way to keep in touch with family in Mexico, Luis pulled out his iPod Touch and typed in "s-k-y-p-e" so he could remember to download the program later.**

### JENN HUETING, University of Missouri, Columbia, at UNC News21

A perennial challenge for journalists is finding real people to illustrate their stories. Two Arizona State University fellows, pursuing a story on undocumented immigrants who enlist in the military, found such a family using Twitter, the social networking tool that allows users to send messages worldwide in bursts of 140 characters, or about 30 words.

Jenn Hueting, a University of Missouri graduate student and News21 fellow at UNC, tried to replicate their success on Facebook. She was in for a surprise when she sent a string of messages to strangers:

**It didn't take me long...to discover how easy it is to snoop around on Facebook... Honestly, this did make me feel a bit like a creeper. And apparently Facebook thought I was a weirdo as well and sent me a warning. [The warning: "You are engaging in behavior that may be considered annoying or abusive by other users."]**

Hueting expressed a wish that Facebook had a way of allowing reporters to troll for willing sources for stories.

**Unfortunately, that wonderful Facebook world does not exist, and because my innocent behavior was deemed as potentially 'annoying or abusive,' I was sent back to square one... begging friends for help. Sad day.**

### ANDREW BURTON and PHIL TENSER, Syracuse University

No fellows posted online more of their adventures and mishaps than Syracuse undergraduates Phil Tenser and Andrew Burton. At a soapbox derby in Hopkinsville, Kentucky, Tenser got clipped by a young racer who neglected to apply the brakes. He toppled headfirst to the ground, unconscious, as EMTs rushed to his aid. Burton Twittered updates from the scene and the hospital emergency room:

**@pstenser survives to tell the tale of a soapbox derby gone bad—is responsive & talking to doctors. photo, video to come**

Soon there was a blog titled "Becoming the News" showing the race (from two video cameras) and Tenser's frightening tumble in slo-mo (from Burton's).

Tenser and Burton hit pay dirt in an Oregon beach town, Lincoln City, when they found a teenager named Kaity Curry who chronicles high school life in a colorful cartoon blog she calls Frankensteinbeck. They quickly posted on the Syracuse News21 web site, www.youngandthewireless.com a "sneak preview" of their video on Kaity Curry. Then, life intimidating art, Tenser and Burton turned up in a panel in Curry's next cartoon, with Tenser wearing earphones, wielding a boom mike and balancing a laptop, and Burton holding a camera and saying, "This is just so cool. You're taking communication to the most primitive level—images. That goes back to hieroglyphics. Yet you're combining that with technology to make it accessible and modern."

### SHARON MCCLOSKEY, Columbia University

More than a few News21 fellows have worked as professional journalists, usually for a few years directly out of college before enrolling in graduate school to learn new skills and advance their careers. Sharon McCloskey followed a different path to journalism school and News21. She is switching careers after a quarter century as a lawyer handling commercial and consumer litigation, including a stint as a deputy state attorney general in New Jersey. A deft writer, McCloskey saw News21 as an opportunity to hone not only reporting and story-telling skills, but to accelerate her own adjustment to the Internet age. News21, she said, "brings me and people like me into the 21st century."

"I come from a generation that just reads newspapers and is still very paper oriented. I see the benefit of trying to change the viewing habits of my generation," she explained. Already she has changed her own. Five newspapers used to land on McCloskey's driveway in Red Bank, New Jersey. "We had the state and local papers as well as the Wall Street Journal and New York Times. I stopped that. Now I go online and read most of my news there. I still get the Times delivered on the weekend, but the rest of the time I used the thing they call the Times Reader. I download the paper before leaving the house and flip through it on the train into the city."

And has she caught up with classmates who grew up with computers and were already at ease with the new, technological demands of the job?

"It depends on who you ask," McCloskey said with a laugh. "I'm better than I was."

post.com, said, "All journalism schools are struggling with the transition that's roiling through the news industry. Most faculty members haven't worked in the news media for a long time and haven't experienced those changes. One of the beauties of News21 is that faculty members are learning alongside the students in these multidisciplinary newsrooms." News21 "gave us a jumpstart" in making the Medill curriculum more multimedia and interactive, said Ellen Shearer, who runs the school's Washington news bureau. "It's had an impact on our curriculum," said USC's Patricia Dean. "The team of people that work on News21 during the summer get a lot of terrific ideas that we then push into our classes and into the curriculum." Judy Muller, the former ABC News correspondent and National Public Radio commentator who has taught at USC since 2003, said, "News21 radically changed my approach to teaching journalism and continues to set the standard, as far as I can see, for a successful marriage of content quality with innovative delivery."


CHRISTOPHER CAMERON

**Arizona State News 21 Fellow Chyrstall Kanyuck profiled Chief Warrant Officer Sam Chavez as part of her News21 project, "Fighting Battles: Latinos in the Military."**

### A Place for Nonprofit News?

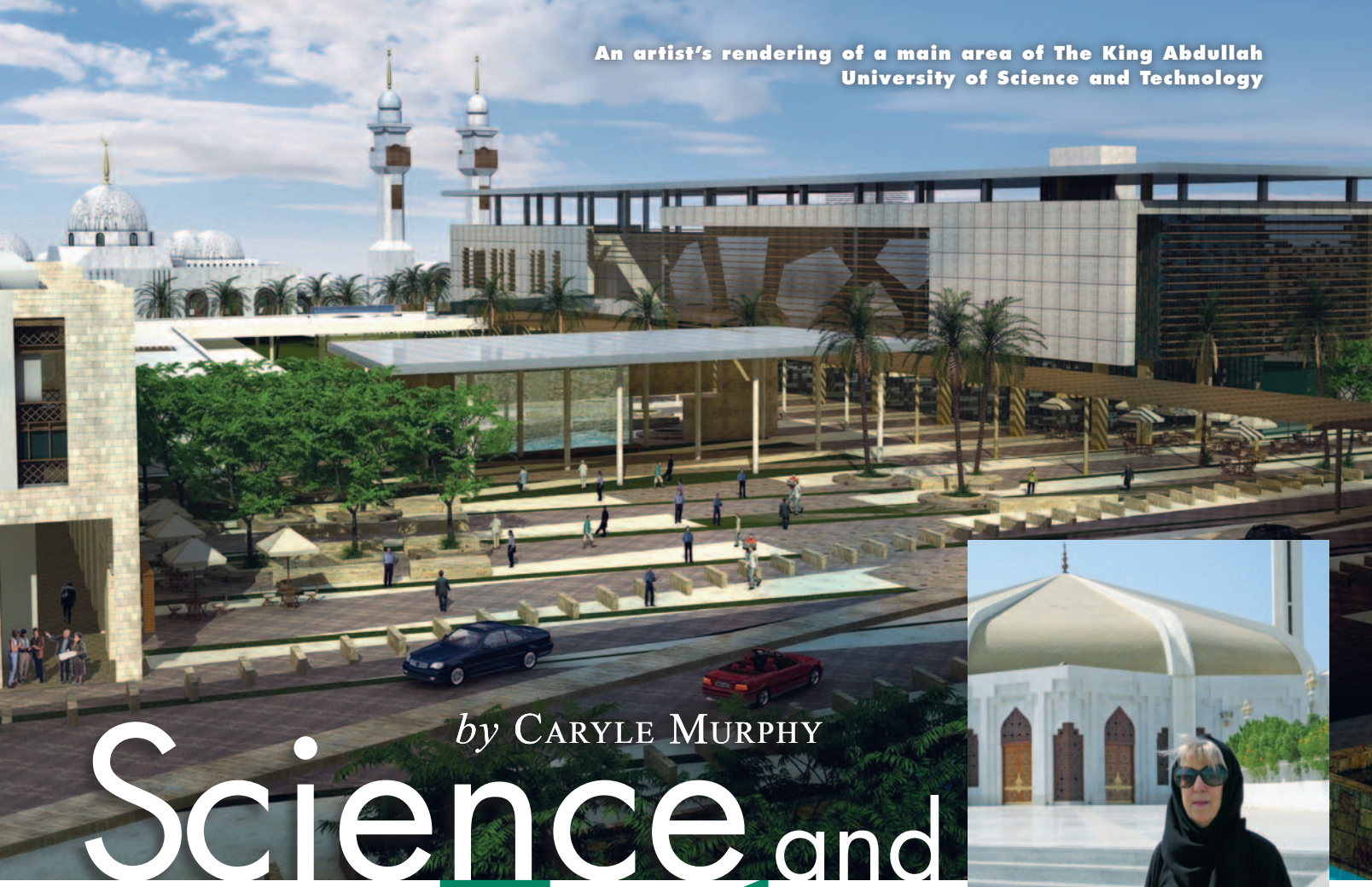
Google, Facebook and, much earlier, the first web browsers all were invented at universities, although not at their journalism schools. News21's participants so far haven't produced a Twitter or even a blog that is a must-read for journalists. But some of its impact may not be known for years. Can it be sustained after the foundation funding runs out? That, too, is an unanswered question. But one of the tasks for Callahan, Brannon and their colleagues going forward is to explore the sustainability of a university-based, nonprofit news organization.

"This may be the biggest challenge facing the News21 partnership. It will require creative thinking about how public and private universities could partner to build a free-standing news operation that has as its primary asset the credibility of a diverse group of young American reporters, their schools and mentors," the deans' funding proposal said.

Already, these journalism schools have succeeded in getting their voices heard in serious discussions about the future of the news business. At a January 2008 Carnegie Corporation summit on "Journalism in the Service of Democracy," *New York Times* editor Bill Keller said he was "a convert to the cause of journalism schools." Keller, an English major at Pomona College, confessed that he used to disdain them and thought the best education a young reporter could get was under some "grizzled editor" at a small newspaper. Now, he said, "I've come to think of journalism schools as maybe the last resort" to give students the wisdom they need. Recalling Keller's remarks, Berkeley's Calo said, "You could argue that this is the first time that graduate journalism schools have had a key role in journalism. Their role before was always ancillary."

Whether News21 reports reverberate in the mainstream media and whether it's a leader or laggard on innovation, the timing of the initiative was impeccable. And Carnegie Corporation's Susan King believes the foundation chose the right leverage point to bring about change in the profession.

"I'm convinced that if we had tried to change the news business, which is what was being asked of us at the beginning, we couldn't have gotten anything done. Working on the pipeline and forcing the schools to face up to these challenges was the only lever to bring about change," said King, a former ABC News correspondent. "It is serving us well to have helped create this entrepreneurial, well-educated generation because they are going to be flexible enough to move with the business—and some will define what that future is." ■



An artist's rendering of a main area of The King Abdullah University of Science and Technology

by Caryle Murphy

# Science and Islam

*In Saudi Arabia, a New University Seeks to Rekindle the Prominence of Science in the Islamic World*

Saudi Arabia is no stranger to huge construction projects. The world's largest oil producer has built oil wells in the desert, massive petrochemical refineries, and skyscraper embossed cities. But no project has been as radical in its vision as the enterprise rising on the flat expanse of brown scrub land around this once sleepy Red Sea fishing village.

For many months, the six-square mile area encircling Thuwal, 50 miles north of Jeddah, was one of the largest construction sites in the Middle East as a 40,000-strong force of hard-hatted workers labored feverishly to meet a royal deadline. Heavy trucks careered over dirt roads, smothering them in dust. Scores of cranes swayed under ponderous burdens of girders, glass walls and generators.

Then, exactly as Saudi Arabia's King Abdullah bin Abdul Aziz had wanted, his dream of 25 years became a reality when the King Abdullah University of Science and Technology (http://

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*Caryle Murphy is the author of* Passion For Islam*, which explores the roots of religious extremism in the Middle East. A former reporter for the* Washington Post*, Murphy now lives in Saudi Arabia, where she works as an independent journalist. She was awarded the Pulitzer Prize for International Reporting (1991) and the George Polk Award for Foreign Reporting (1990) for her coverage of Iraqi-occupied Kuwait and subsequent 1990-1991 Gulf War.*

www.kaust.edu.sa/) opened its doors in September 2009. To ensure that the graduate research university got off to a good start, the Saudi monarch bestowed it with a multi-billion dollar endowment, reportedly at least $10 billion, making it one of the most richly endowed universities in the world.

He also charged it with a visionary mandate. "Wishing to rekindle and spread the great and noble virtue of learning that has marked the Arab and Muslim worlds in earlier times," he said, the new university is meant to be "a new 'House of Wisdom'...[and a]...beacon for peace, hope, and reconciliation" for the "benefit of all the peoples of the world....Our intention is to create an enduring model for advanced education and scientific research." This endeavor is "in keeping with the teachings of the Holy Quran," he added, "which explains that God created mankind in order for us to come to know each other."

In his eighth decade, the king has issued an invitation to fellow Muslims. He has asked them to help resurrect early Islam's tradition of creativity and leadership in science and technology. It is this request that makes the new university, widely known by its acronym, KAUST, potentially more revolutionary than any of Saudi Arabia's other building projects.

King Abdullah is seeking to "transform the Saudi economy from a commodity-based economy to a knowledge-based economy," KAUST spokesman Jamil F. Al Dandany said in an interview. "He wants to put the Arab world and Saudi Arabia in a respectable place on the world research map...and he wants a place...where people from different nationalities work together in harmony and peace, productively. This is his vision."

But KAUST's establishment—and Abdullah's mandate—raise nettlesome questions: Why are they necessary? What happened to Islam's leading role in the sciences that makes it in need of "rekindling"? Given Islamic civilization's early years of robust curiosity and creativity in this field, why have there been so few Muslim Nobel Prize winners in contemporary times? Why are there so few research centers in the Muslim world? Where is the relationship between Islam and science going today?

## The History

"Iqra!"

"Read!"

The first word in Islam's holy book, the Qur'an, was taken by early Muslims as an injunction to use their minds to pursue all kinds of knowledge. They were encouraged to learn aggressively and, as the famous Islamic proverb says, to "seek knowledge even unto China," that is, to the ends of the earth. They valued empirical observation of the natural world because it was God's creation and they saw no conflict between this endeavor and their faith.

"In the Qur'an you have many verses that call upon believers to witness and marvel at God's creation," Columbia University historian of Islam as well as the recipient of a 2009 Carnegie Corporation Scholars Program fellowship, Richard Bulliet, said in an interview. "There's absolutely nothing contrary to the concept of science."

After Prophet Muhammad's death in 632 AD, Islam quickly spread out of southern Saudi Arabia, establishing itself in Baghdad, Damascus, North Africa and beyond. Muslim-ruled Al Andalus in southern Spain was a model of tolerance and diversity as Muslims, Jews and Christians lived in relative harmony under the spirit of *convivencia*, or co-existence. For the next five centuries or so, Islamic civilization dominated the lands between Samarkand and Spain.

In this early Islamic empire, Muslims involved in intellectual pursuits practiced *ijtihad*. The word, which originated in legal debates, comes from the same Arabic root that gives us "jihad," or "holy struggle." Ijtihad means exerting one's utmost efforts to understand something and how it should be viewed or judged in light of

**An artist's rendering of The King Abdullah University of Science and Technology**

Islam's moral and spiritual precepts. This intellectual approach was applied to the acquisition of all types of learning, not just religious or spiritual wisdom. It made the faith adaptable to many different societies, and gave it plenty of pluralism, including several different legal schools of thought (Hanbali, Shaafi, Maliki and others).

Ijtihad also betokened the curiosity Muslims had about the world around them. The best and brightest probed the problems and mysteries of mathematics, astronomy, law, geography, medicine and chemistry. Renowned libraries and research centers were established in such cosmopolitan Muslim-ruled cities as Baghdad, Damascus, Alexandria, Cairo and Cordoba. Everyone, including Jews and Christians, wrote in Arabic, which became "a language of science without religious significance," Bulliet said.

Islam's Abbasid caliphate in Baghdad in the eighth century witnessed "a scholarly renaissance... hardly less important than that which transformed Europe during the seventeenth century," declared the United Nations Development Program's 2003 *Arab Human Development Report*. "Science and its applications became a part of social practice, through teaching and research. Scholarship was never marginal in the Islamic-Arab city, or in the popular culture...An appetite for knowledge became one of the hallmarks of Arab culture."

The bureaucratic needs of Islamic government that now covered vast territories were an incentive for scientific scholarship. "The vast new state, teeming with multiple cultures and systems, called out for development and unification," noted the UN report. "The extraction of groundwater, the digging of canals, the establishment of cities, the extension of roads, the organisation of ministries (diwans), the levying of taxes, the survey of lands and other activities led to the unification of calculation systems and the utilisation of algebra and geometry."

As George Saliba, Columbia University professor of Arabic and Islamic Science and another recipient of a 2009 Carnegie Corporation Scholars Program Fellowship, noted, "the utilization of science for the service of society was well-felt and well-appreciated." And although Muslim religious authorities had contentious relations with Muslim philosophers in this period of Islamic civilization, they did not clash with Muslim scientists, Saliba added. Indeed, many Islamic scientists were also religious scholars or employed in official religious positions such as judges, or timekeepers. Astronomer Ibn al Shatir, for example, whose theories are believed to have influenced Copernicus centuries later, was timekeeper of Damascus' main mosque.

Muslim astronomer and author Imad-ad-Dean Ahmad noted that religious scholars also contributed to Islam's emerging scientific tradition in their methodology for verifying the credibility of traditional stories, or hadiths, about Prophet Muhammad. Ahmad, who also heads the Maryland-based think tank Minaret of Freedom Institute, said the scholars traveled far and wide to document, backwards in time, the line of transmission of these hadiths, discarding ones they could not find historical evidence to support. By the tenth century, this methodology of written authoritative citation—a key element of modern science—was influencing investigations in the natural sciences.

And most important, perhaps, translating the scientific heritage of Greek civilization into Arabic was a key aspect of early Islam's scholastic endeavors. Saliba argues in his book, *Islamic Science and the Making of the European Renaissance* (MIT Press, 2007), that Muslim translators not only saved those manuscripts from obscurity but also built on the knowledge within. For example, he writes, in order to compute the direction of Mecca so Muslims could face their holy city during prayer, Muslim mathematicians had to develop spherical trigonometry, which was unknown in the Greek or Indian mathematical traditions.

## The Setback

What happened next—and why—remains a major focus of contemporary scholarly debate and research.

Starting in the twelfth century, Islam's robustly curious intellectual approach to the natural world began to whither. This decline was a complicated, drawn-out historical process brought on by a skein of complex, inter-related causes.

Some scholars cite traumatic political developments. In 1258, the Mongols invaded and sacked Baghdad, site of Islam's first "House of Wisdom," which for 400 years had served as a library and unrivaled research center in the humanities and sciences. The Mongols destroyed this intellectual treasure, trashing or burning thousands of books. Legend has it that the Tigris ran black with ink from manuscripts tossed in the river.

Another momentous political event came in 1492, when Christian Spanish armies brought an end to Muslim rule in Spain. The takeover of Al Andalus demolished *convivencia*, which had spurred scientific creativity by fostering intellectual interaction among different religious and ethnic groups.

Other scholars stress religious reasons for the gradual decline of Muslim scientific acumen, citing the impact of such figures as eleventh century theologian Abu Hamid Al Ghazali, who attacked philosophers for attempting to prove God's existence through ratio-

nal thought and logic. He also vilified Aristotelian physics for postulating "two sets of laws instead of one for the universe," writes astronomer Ahmad, which was seen as contradicting the Qur'anic teaching that God is the sole origin of the entire world.

Ghazali's theological legacy was complex and controversial. Many scholars blame it for contributing to the dampening of rigorous intellectual inquiry among Muslims. But it was, rather, a misunderstanding of his ideas, writes Ahmad, that led to "a legacy which closed the door to ijtihad and to innovative Islamic thought."

Historians have also documented how religious knowledge came to be regarded as superior to the natural sciences and philosophy. At the same time, religious scholars grew increasingly conservative in their interpretations of the Qur'an as they sought to make their faith more uniform in thought and practice throughout a diverse Islamic world. Rather than exercising ijtihad to develop new religious rulings for new conditions, they preferred to stick to legalistic reformulations of past rulings. By the fifteenth century, the written corpus of Islamic legal rulings and Quranic interpretations came to be seen as final and complete. Muslims call this phenomenon "the closing of the door of ijtihad."

Creativity in all domains was affected. "Aversion to innovation is, of course, fatal to science" and by the fifteenth century, "the effect...on scientific progress in the Islamic world was unmistakable," writes Ahmad. "Political backwardness and scientific backwardness," he added in an interview, "come from the same root. It was falling away from ijtihad."

Some experts disagree, contending that historians of Islam have exaggerated the decline of ijtihad and scientific research. "There is no such thing as the closing of gates of ijtihaad...it's a folly widely spread," Saliba said. He argues that Muslim scientific achievements continued through the sixteenth century despite conservative religious trends, as represented by Ghazali. Moreover, as Arabic texts were translated into Latin, Muslim scientific insights reached European minds and influenced the development of science in Europe during the Renaissance. "Anyone who takes the time to read the scientific production in the post-Ghazali period," Saliba writes, "would have to characterize this period as the most fecund, and in the field of astronomy in particular, completely unparalleled."

The better question to pose, Saliba says, is why, starting in the fifteenth century, Europe shot ahead of every other civilization—both Islamic and Chinese—when it came to scientific advances. The answer, "has nothing to do with Islam," he says. "People should stop thinking in religious terms." Rather, Europe's leap was the long-term consequence of a historical process that began with the discovery of the New World. "What happened in Europe is that a European sailor named Christopher Columbus accidentally bumped into a world unknown," Saliba said. That discovery shifted global trade traffic to the Atlantic and away from the ancient sea and land trade routes controlled by Muslim-ruled regions. The age of European, and later American colonialism, followed, which meant that "the resources of the whole world were pumped into Europe, and after the nineteenth century, into the United States," he explained.

Europe's scientific advances in the sixteenth and seventeenth centuries "were the product of this dynamic cycle of wealth...Wealth drove further production of science and in turn, science allowed the acquisition of more wealth," Saliba wrote. "The age of decline in the Islamic civilization... was less caused by such factors as a book of Ghazali or the invasion of the Mongols, than by the external world circumstances of the sixteenth century and thereafter."

Something else pushed Europe ahead of Islam and other civilizations, according to Saliba. Europeans were the first to link scientific inquiry to commerce, most visibly through patenting, which emerged at the turn of the sixteenth century. This practice, which other civilizations are now emulating, was "the genius of Western civilization," Saliba said.

Whatever the causes, Muslim lands of the Middle East after the fifteenth century became more discouraging than encouraging of independent, creative thinking. The pursuit of all kinds of knowledge through collective ijti-

*By the fifteenth century, the written corpus of Islamic legal rulings and Quranic interpretations came to be seen as final and complete. Muslims call this phenomenon "the closing of the door of ijtihad."*

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**Saudi Arabia's King Abdullah bin Abdul Aziz al-Saud.**

had was no longer the driving force of Muslim advancement.

By the end of the nineteenth century, Muslims were doubting themselves and wondering what had happened to their golden age of scientific inquiry. Some clearly saw that the Europeans' dominance was not because they were Christian or superior but because they had mastered modern science. "We see no reason for [Europe's] position of wealth and power except their progress in education and the sciences," wrote Muhammad Abduh, one of Egypt's greatest religious thinkers. "Our first duty, then, is to endeavor with all our might and main to spread these sciences in our country." Islam, Abduh added, "declares openly that man was not created to be led by a halter, but that it is his nature to be guided by science and by signs of the universe and the indications of events."

## Bright Spot

Today, many in the Muslim world recognize the need to restore science to its esteemed place in Islamic culture—a task made even more urgent by globalization.

"The knowledge gap separating the Arab and Islamic nations from the advancement of contemporary global civilization is becoming deeper and wider," Saudi Aramco president and CEO Abdallah S. Jum'ah declared at KAUST's October 2007 groundbreaking. "Based on knowledge indices such as the number of basic and advanced research papers published, the number of scholars and engineers engaged in research and development...and the number of patents registered in the Arab and Islamic world, we must certainly conclude that the nation the Qur'an has exhorted to 'read,' has gone astray from God's admonition to seek knowledge. The fostering of a culture of scientific research and indigenous development capabilities is imperative."

Jum'ah's jeremiad was earlier proclaimed by the UN's 2003 *Arab Human Development Report*. In a stark assessment, it noted that Arab countries, afflicted by a severe brain drain of scientists and dispensing less than two percent of their GNP on research and development, had "fallen far behind" the rest of the world in acquiring knowledge. "Knowledge in Arab countries today appears to be on the retreat" while "the developed world is racing towards knowledge-intensive societies," the report said. If not arrested, this trend will leave Arab countries "in a marginal position in this next phase of human history [which is] an untenable course if the Arab people are to have a dignified, purposeful and productive existence in the third millennium."

The report urged political, social, and educational reforms to promote greater intellectual freedom as well as a new theological stance to reflect the ancient Islamic belief that "knowledge closely approaches a religious obligation."

"The essential point is that the exploitation of religion, for objectives far removed from its sublime purpose and soul, can no longer be tolerated if Arab society is to free itself to build a living knowledge society," the report stated. "In Arab countries where the political exploitation of religion has intensified, tough punishment for original thinking, especially when it opposes the prevailing powers, intimidates and crushes scholars."

Increasingly, Muslims are demanding that the door of ijtihad be re-opened. Scholars like Arabic linguist Abu Zaid, an Egyptian, are reading the Qur'an in a new light to reach interpretations more in line with modernity. Young American Muslims at Zaytuna Institute in California are planning the first Muslim university in the United States, which would promote an Islamic theology supportive of creative scholarship in all fields. And Arab governments in places like Jordan, Dubai, Abu Dhabi and Qatar are beginning to increase spending on basic scientific research

in hopes of reversing the Middle East brain drain. KAUST is perhaps the region's most ambitious venture in this intellectual jihad.

### Kaust

Soon after ascending to the throne in 2005, King Abdullah moved to realize his long-time dream of re-establishing Islam's preeminence in the sciences. In a hurry to launch KAUST, the monarch entrusted the mission of building the university to his country's most efficient enterprise: Saudi Aramco. The government-run oil company, said university spokesman Al Dandany, "is the only institution in the country that has extensive experience in building mega-projects. It has the international network. It has the technically trained staff."

King Abdullah formally inaugurated the university with a lavish gala that featured fireworks, an indoor laser show and a sit-down dinner for 3,000 international guests, including several heads of state, diplomats, scientists, educators and corporate leaders.

As the kingdom's first co-educational university, KAUST is demolishing a fiercely-held Saudi taboo against gender mixing. Women and men will study and work together, women will be able to drive on campus (unlike in the rest of the kingdom) and the Saudi dress code, which mandates an enveloping black robe for females, will be relaxed with the only requirement being that all persons must dress modestly.

KAUST's inaugural class of 374 students are all on scholarships. Saudis comprise the largest nationality at 15 percent, followed by Chinese (14 percent), Mexican (11 percent) and American (8 percent). University officials are aiming for 2,000 students pursuing masters and doctorate degrees with a faculty of 225 by 2020. Currently, it has 71 faculty members.

To ensure that KAUST got "world-class" faculty, Al Dandany said, it has formed search committees with several foreign universities, including Stanford, Cambridge, Imperial College London, the University of Texas at Austin, and Berkeley. While most faculty have five-year contracts and travel between their home countries and the kingdom, it is hoped that full-time faculty will eventually live and work at the Thuwal campus, planned as a town for 20,000 residents. The attraction for foreign scientists, Al Dandany added, is that they will not have to spend time applying for grants because their research will be funded by KAUST. In addition, they will have access to good students and state-of-the-art research equipment, including Shaheen, one of the world's fastest supercomputers, nuclear magnetic resonance machines, and an advanced audio-visualization center that allows scientists to walk inside life-size, virtual duplications of such places as archeological sites or underwater coral reefs. These high-tech facilities cost $1.5 billion, just part of the estimated $5 billion spent building the entire palm-fringed campus, which also has a golf course, a heliport and 8 square miles of protected marine life in the Red Sea.

KAUST's academic life will be organized around research centers in which scientists from different disciplines will work on areas such as desalination and solar energy. Students will do course work, but their main activity will be research in such fields as bioscience, chemical and biological engineering, earth science, environmental science and mechanical engineering.

KAUST also is funding research at various universities around the world on scientific and technological problems in such areas as molecular

> *"Based on knowledge indices such as the number of basic and advanced research papers published, the number of scholars and engineers engaged in research and development...and the number of patents registered in the Arab and Islamic world, we must certainly conclude that the nation the Qur'an has exhorted to 'read,' has gone astray from God's admonition to seek knowledge."*
>
> —**Abdallah S. Jum'ah,** *Saudi Aramco president and CEO*

photovoltaics, computational science, nanomaterials (specifically, nanoparticle ionic materials, or NIMS), and applied mathematics. And following King Abdullah's directive that KAUST should collaborate with the private sector, it has entered into partnerships with international companies including Dow Chemical, Boeing and IBM for joint research on projects such as energy alternatives to oil.

"KAUST will begin by focusing on areas of science and technology where it can make intellectual and societal impact," KAUST president Choon Fong Shih* has said. "For instance, I can see KAUST researchers improving water desalination technology to make irrigation of deserts possible and economical; undertaking genome research to enable plants to grow in arid conditions; and making solar power cheap and widespread, bringing electricity to the millions who still live without."

KAUST's mission of creating a knowledge-based society "means producing knowledge that can be commercialized around which industry can grow. It means producing ideas that people can take and commercialize," Al Dandany said. "We see our students not as job-seekers but as job-creators...The goal is to create advances that can be commercialized for the benefit of others."

To Columbia University scholar Saliba, this "marriage between science and commercial activity to produce ideas" sounds very much like what he identifies as the key that propelled Europe's scientific advancement over other civilizations. "Bravo. They finally figured it out!" Saliba quipped. The Saudis have realized, he added, that advancing their society means "catching up with modernity, which has been defined as capturing the knowledge of science." King Abdullah put it this way at KAUST's inauguration: "Throughout history, power has attached itself, after God, to science," he said. "And the Islamic nation knows too well that it will not be powerful unless it depends, after God, on science."

As with any ambitious project, however, there are questions about KAUST's ability to become a world-renowned center of learning, as well as to positively impact Saudi Arabia.

In early Islam, scientific achievements emerged organically from Muslim-ruled societies and developed gradually over centuries. By contrast, KAUST is a gold-plated endeavor created from the ground up in record time that, for now, will be relatively isolated from the rest of Saudi society. KAUST, moreover, has been set up in a country whose official brand of Islam, Wahhabism, is considered one of the faith's most anti-intellectual strains because of its rejection of new ideas and pluralist thinking. The Saudi religious establishment, perhaps the most conservative in the Muslim world, is noted for its anti-science mindset. To this day, some Saudi scholars insist on seeing the new moon crescent with the naked eye before declaring the start of Ramadan. This practice continues despite many other Muslims' insistence that astronomical calculations are just as good, if not more accurate.

Saudi Arabia's justice minister recently said he wants to start a dialogue between religious scholars and astronomers in order to bridge "the rift of mutual suspicion [between them]. The astronomers believe that the scholars who disagree with them do not rely upon established scientific facts...while some scholars believe that the astronomers hold scientific hypothesis above Shari'a texts."

KAUST officials insist that academic freedom will be guaranteed. And King Abdullah has said that "protecting freedom of research, thought and discourse related to scholarly work will be among the primary objectives" of the new institution. The university sees itself "as a catalyst" for transforming Saudi Arabia into a knowledge-based society, Al Dandany said. This is a transition that requires not just a vision, but also a commitment to implement it over the long term, noted Columbia University scholar Bulliet. "It doesn't happen just by building new buildings and hiring new professors."

Bulliet evoked a sports analogy. "Someone in Saudi Arabia said 'The World Cup is a big deal—let's try for it.' And Saudi Arabia has now made its mark in football. The Saudi team is respected...Science is really big football. Somebody has to decide we're going to do this...and get a nucleus of people who've shown they can do it. Then give them money, equipment and downstream support. If you can do it with football you can do it with...particle physics—It's a question of a vision from the top and a commitment to follow that up on the part of the political leadership."

King Abdullah is doing his part to throw wide open the door of ijtihad. And if KAUST propels Muslims to regain the intellectual high ground that their faith enjoins them to seek, then it could transform the Muslim world—for it will expand the minds and nurture the creativity of modern Muslims who already are in search of their Islamic Renaissance. ■

** Choon Fong Shih is the founding president of KAUST as well as a professor of mechanical engineering at the university. An internationally recognized researcher and academic leader, Professor Shih joined KAUST after nine years as president and vice-chancellor of the National University of Singapore. He is also chairman emeritus of the Association of Pacific Rim Universities (APRU), a consortium of 37 leading research universities modeled after the premier Association of American Universities, and chaired the governing board of the APRU World Institute, an institute of advanced studies seeking to address scientific, social, and economic issues of global importance.*

*by* M. J. Zuckerman

# Nuclear Risk vs.

*Nuclear power is poised for a renaissance but with countries like Iran developing nuclear resources, concerns about nuclear safety remain high.*

Thirty years ago, before dawn on March 28, 1979, along the Susquehanna River a few miles south of Harrisburg, Pennsylvania, America's nuclear power industry failed. The Three Mile Island (TMI) nuclear accident became the realization of the world's greatest fears about nuclear energy.

"A major accident anywhere is a significant problem everywhere because everyone will question the power plants in their country," says Micah Lowenthal of the National Academies' Nuclear and Radiation Studies Board, reciting what he calls "a popular mantra," that came into vogue after the TMI accident rippled across the nation and throughout much of the world, seizing domestic construction of nuclear power plants and dramatically slowing the growth of nuclear power worldwide from that day forward.

And yet, three decades after that incident, the South Texas Project, a nuclear power plant about 90 miles southwest of Houston, Texas, on the Colorado River, has established itself as an icon of operational safety. The South Texas Project is not an exception; it's a leading example of an industry that has found its way out of the darkness.

Fearing for its survival, during the past 30 years, the nuclear power industry, led by the World Association of Nuclear Operators, embraced a strict culture of operational safety and security which, although marred by several notorious lapses, appears to have paid off, avoiding any critical failures since the 1986 disaster in Chernobyl, and even winning over some critics.

"The reactors that we have today are much, much safer than they were in the days of TMI and Chernobyl, by various indicators; they are orders of magnitude safer," says Matthew Bunn, a leading nuclear research scientist at Harvard's Project on Managing the Atom.

In that context, it sounds reasonable for the industry and governments to be contemplating a "Nuclear Renaissance"—currently, there are proposals to build 30 new reactors in the United States and another 300 worldwide, with 30 nations making serious proposals for their first-ever nuclear reactors—to counter the "triple threat" facing America and the world:

- Increasing demand for oil and gas, complicated by dependence on wildly fluctuating prices of Middle East reserves;
- A growing demand for electricity, both domestically and globally, which is expected to double current needs by 2030, especially in China (which is leading global energy demand with an average 4.2 percent increase per year through at least 2025) and India (second at 3.2 percent annual growth);
- And, most dramatically, global climate change associated with the use of fossil fuels, primarily coal-fired plants used to generate electricity.

President Barack Obama alluded to these issues in his inaugural, saying,

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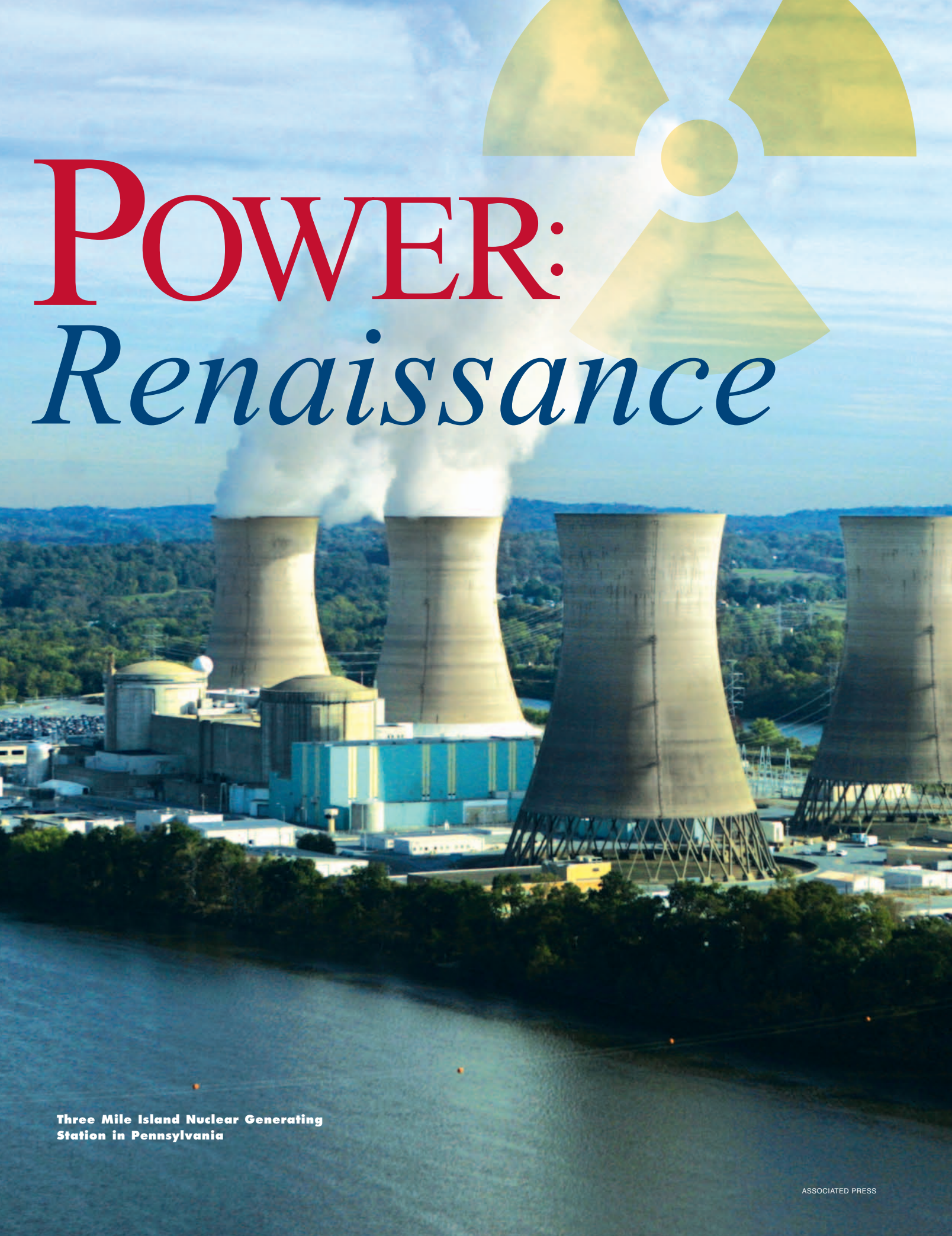
# POWER: *Renaissance*



**Three Mile Island Nuclear Generating Station in Pennsylvania**

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"...each day brings further evidence that the ways we use energy strengthen our adversaries and threaten our planet."

Indeed, the most dynamic of these three threats, the imminent danger of global warming, a post-Cold War form of mutually assured destruction, is doing the most to galvanize public opinion toward some immediate, massive shift in energy generation, winning converts to the need for a nuclear renaissance.

Sam Nunn, the former Democratic senator from Georgia, who has devoted his post-Capitol Hill career to resolving the global threat of nuclear weapons proliferation, is avowedly pro-nuclear power, despite the potential dangers of giving dozens of nations the capacity to build weapons, which he argues can only be countered by international inspection regimens and multinational controls on proliferation technologies.

"We are in a race between cooperation and catastrophe," Nunn says. "There is the shaping of a perfect storm in the nuclear industry making a renaissance. I happen to support nuclear power, based on safety and security and reliability; it has to be...part of the answer on the carbon problem.

"The Non-Proliferation Treaty requires that every country that wants to gain peaceful nuclear technology has the right to do so. The Iranians are claiming that as their right to go into enrichment. The problem is that if you can enrich, or low-enrich uranium to burn legitimately in power plants you can also enrich...right up the scale to highly enriched uranium (for use in weapons). So...we are on the verge of a proliferation of enrichment."

A 2004 study by two Princeton scientists, Stephen Pacala and Robert Socolow, has become the seminal work on how nuclear power can be harnessed to stabilize, if not reduce, global warming. Pacala and Socolow argue that given the widely anticipated doubling in energy demand by mid-century—which they predict would accelerate carbon output to about 25 billion tons through 2050—we must, at a minimum, find proven ways to avoid any growth in the current carbon output. They identify seven areas, or "wedges," by which this can be accomplished. One wedge is nuclear energy: To reduce carbon output by one billion tons a year, thus keeping greenhouses gases at current levels, would require an estimated 1,070 reactors (generating 700 gigawatts of electricity) to be constructed by 2050 worldwide. That's an average of about one new reactor every two weeks for 40 years.

Those are staggering numbers.

"It's not impossible, but it's very challenging," says Charles Ferguson of the Council on Foreign Relations, noting that France and Japan grew their nuclear power capacity at that rate during the 1980s.

One of those in an expansion mode is the United States, where the Bush administration encouraged "renaissance" by offering $18.5 billion in loan guarantees and streamlined nuclear power plant licensing for those making formal applications by December 31, 2008; thus, domestically, 21 companies are lined up to construct 34 plants.

But after decades of stagnation, the nuclear power industry infrastructure has severely atrophied. There is a crippling lack of scientists and trained personnel, a void of specialized construction materials and components. It's widely thought that outside of Japan, China, India and France, it will be a matter of building a highly sophisticated industry from scratch.

So it seems difficult to imagine a "renaissance"—the challenges are vast and resources are in short supply. Perhaps a "revival" is a more accurate forecast. According to many experts, it is simply not realistic to think the many daunting problems associated with massive expansion of nuclear power can be answered any time soon.

"I don't think anyone who is rational would say that the most ambitious plans are going be realized," says Lowenthal, who served as the director of a 2008 study *Internationalization of the Nuclear Fuel Cycle*, involving scientists from the United States, Russia and the International Atomic Energy Agency (IAEA), and

*Mahmoud Ahmadinejad has repeatedly stated that his country will not negotiate on its right to enrich uranium.*

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funded by Carnegie Corporation of New York and the John D. and Catherine T. MacArthur Foundation.

Perhaps the most daunting problem affecting any "renaissance" is financing the astronomic costs of plant construction—conservatively, $5 billion to $9 billion per plant, which investors, especially in North America and Western Europe, have been loathe to undertake due to the risks associated with plant construction (a historical record of massive cost overruns, years-long delays and, ultimately, failures to complete construction). Add to that the persistent stigma of past accidents and predictions of increased safety incidents over the next 20 years as all 107 commercial reactors in the United States, currently operating at or above 90 percent capacity, reach the end of their intended 40-year operating lives. About half of those plants have been granted 20-year extensions—ultimately, all are likely to be approved extended life spans—and the Nuclear Regulatory Commission is contemplating expanding the power output those plants were originally designed and licensed to produce. Globally, simply replacing the aging fleet of existing reactors, without any expansion, is estimated at $1.5 trillion.

Then, in terms of the dangers of developing nuclear energy, there is the extraordinary threat of nuclear weapons proliferation arising from uranium enrichment, essential to fueling plants, as well as spent fuel reprocessing. Dozens of nations are proposing new nuclear power reactors, many in the Middle East, at least some with interests having as much to do with positioning themselves to become nuclear weapons powers as nuclear energy generators. Iran is the one grabbing most of the headlines at the moment. Yet while nations with nuclear weapons ambitions will be hard to dissuade or control, the financial challenges to ante up a bid for nuclear power will likely serve to trim the field. The high upfront capital costs of these reactors suggest that few of the recently proposed plants are likely to come online in the near future.

"The invisible hand of the marketplace is on the side of nonproliferation," observes Frank von Hippel, a leading scholar on nuclear issues and professor of public and international affairs at Princeton University.

And even if all of the new nuclear power plants currently being proposed were to be completed successfully, research by Sharon Squassoni, a senior associate with the Carnegie Endowment for International Peace, demonstrates that a doubling of global electricity demand means that "nuclear energy is unlikely to keep its market share, [dropping] from its current 16 percent to 10 percent of worldwide electricity generation." Domestically, she reports, nuclear energy can retain its current 19 percent share of the U.S. electric market only if an additional 50 new reactors—20 more than currently proposed—are on line by 2025.

While global demand for energy and the threat of climate change are making "nuclear energy an [attractive] path to energy security" the reality is that the projected benefits seem unattainable, according to Squassoni.

"If nuclear energy can't really make a difference in terms of global climate change, are the huge costs and risks really worth it?" asked Squassoni in congressional testimony last year.

## Nonproliferation and Security

While a large portion of the scientific community argues that nuclear power must "remain on the table" as an option for electrifying the world, Amory Lovins promotes a different energy approach, one which he says addresses global warming while avoiding the various safety and security concerns associated with nuclear power.

Lovins, chief scientist and founder of the Rocky Mountain Institute (RMI), a cutting-edge think-tank on energy and the environment, promotes micropower, a term coined by the *Economist* magazine, which includes "co-generation"—gas-fired technology used to heat buildings at about half the cost in fuel and carbon associated with electricity—and "renewables," such as wind, solar, thermal and photovoltaic[1], small hydro[2], geothermal, biomass and waste generation, which are available today and "in the future, tidal currents, waves, possibly ocean thermal."

These technologies, says Lovins, have the added benefit of being financially sound, unlike nuclear power which he, and many others, maintain is simply not competitive in the open market, *unless* it is subsidized by governments.

The cost of nuclear power is largely in the up-front, construction-side, which runs between $5 billion and $10 billion per plant, while the cost of generating power thereafter is relatively inexpensive. Von Hippel currently estimates "median capital costs" at around $4,000 per kilowatt hour and generating costs thereafter at around 10 cents per kilowatt hour. These estimates, however, do not include costs of decommissioning plants or the storage of spent fuel. A 2007 Moody's Investor Services report estimated "all-in costs" at $5,000-$6,000 per kilowatt hour, but in 2008 revised that figure upwards to $7,000 per kilowatt hour for plants built in the United States. By comparison, von Hippel reports that his most

[1] *Photovaltaic energy involves converting energy from the sun directly into electricity.*
[2] *Hydroelectric power generated on a small scale to serve a specific area, such as a particular community or industrial plant.*

recent conversations with Tennessee Valley Authority officials forecast coal-fired plants, which are assuming a likely carbon "cap-and-trade" protocol, could be looking at as much as $4,000 per kilowatt hour.

Squassoni concludes in her analysis that "enough venture capital [is] available to finance a 'nuclear renaissance' but much will be determined by the level of risk. This is where governments get involved. The bottom line is that nuclear power expansion will not be possible without significant government support across the board."

Government commitments in the forms of loan guarantees or subsidies tend to quell the kind of risk aversion that arises from the nuclear industry's past performance record: of all the 132 nuclear plants built in the United States (52 percent of the 253 originally ordered), roughly 21 percent were permanently or prematurely closed due to reliability or cost problems, while another 27 percent have completely failed for a year or more at least once, according to Lovins.

And, while "risk" can be analyzed in many ways, arguably the greatest global risk arising from nuclear energy is not to financial markets but can be calculated based on the threat to human survival: the potential for nuclear weapons proliferation.

"If nuclear could pass the competitiveness test, then my first concern about it would be proliferation, well ahead of safety, sabotage, accidents, waste, and so on," says Lovins. "It's been obvious for decades that the two really big issues in energy externalities were climate change and proliferation. We'd better not get in the position of having to choose between them."

Nuclear power reactors, he argues, "are the main driving force behind proliferation because they provide do-it-yourself bomb kits; that is, they deliver needed materials, equipment, knowledge, skills, and organization all wrapped in an innocent looking civilian disguise and often given or subsidized by an exporting government."

At the heart of the proliferation issue is the matter of "fuel cycle," the danger that fuel used to operate nuclear reactors or the technology for making that fuel could be applied to building weapons.

Nearly 90 percent of today's commercial nuclear reactors are fueled by low-enriched uranium—unsuitable for use as weapons-grade uranium, which calls for highly-enriched uranium. However, for a nation possessing the technology for enriching uranium from its natural level of 0.7 percent to the 5 percent levels (known as low-enriched uranium, or LEU) necessary to power a light-water nuclear reactor, it is only a matter of continued processing to reach 90 percent enrichment (or, highly-enriched uranium, HEU) required for fueling weapons. Additionally, on the other end of the fuel cycle, spent LEU can be reprocessed, which yields reusable LEU, toxic waste and weapons-grade plutonium.

The fear is that the ability to create LEU through enrichment or reprocessing is like experimenting with an entry level drug; it's tempting to move up to the hard stuff, if only to experiment, as a means of impressing regional adversaries and friends. And, the tough part of bomb making is not so much the warhead, but the fuel.

The good news is that nations are not lining up to build enrichment plants. Outside the eight nuclear-weapons nations (Britain, China, France, India, North Korea, Pakistan, Russia and the United States) only Japan, Germany


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**French President Nicolas Sarkozy (center), World Energy Council Chairman Pierra Gadonneix (right), and AREVA Chairwoman Anne Lauvergeon (left), visit the construction site of a reactor in Flamanville, France (see right) designed by AREVA, a company involved in nuclear power. AREVA is majority owned by the French government.**

*Government commitments in the forms of loan guarantees or subsidies tend to quell the risk aversion that arises from the nuclear industry's past performance record.*

and the Netherlands operate enrichment facilities. Brazil and, notably, Iran, are looking to join those with enrichment capacity. In fact, Iranian president Mahmoud Ahmadinejad has repeatedly stated that his country will not negotiate on its right to enrichment.

Reprocessing may be proving economically unpopular. Japan is the sole non-nuclear weapons state doing reprocessing; French and Russian reprocessing operations are at about half capacity and the British plant is shutting down for lack of contracts.

But proliferation is more complex.

"Proliferation is a key risk, and it's not only the enrichment and reprocessing," says Matthew Bunn of Harvard. "It's also that countries build up a cadre of people with experience in nuclear technology, they build up powerful bureaucracies that in some cases may end up lobbying for nuclear weapons if they see that as being in the interest of their nuclear institutions."

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This has spurred proposals for expanding international or multinational solutions by which nations already in the business of enriching and, or, reprocessing nuclear fuel would provide market-friendly services under an agreement by which the non-producing nation would foreswear enrichment or reprocessing, agreeing to invasive inspections to guarantee compliance.

"Over the long term, we need to move in the direction of all highly enriched uranium-capable plants, that is, all enrichment plants and all reprocessing plants for plutonium, coming under some form of multilateral or international control," says Bunn. Under these proposals, the producing nations would also face scrutiny of IAEA inspection regimens.

"The risk that the state where an enrichment plant is located will take it over and use it for weapons purposes will be at least somewhat lower if that plant is under multinational or international control than if it is fully owned, operated and staffed by that state," says Bunn.

Four enrichment plants operate on this basis in Europe (France, Britain, Germany and the Netherlands), financed and operated by a consortium of nations that rely on those plants for nuclear fuel.

Russia recently created the International Uranium Enrichment Center (IUEC) at Angarsk, on a slightly different model: Russia will have sole control, but investor nations—notably, Armenia, Kazakhstan and Ukraine—have chosen to forego developing their own enrichment facilities in return for guaranteed supplies of LEU. Additionally, the IUEC proposes to maintain 120 tons of LEU as an IAEA-controlled fuel bank, through which the UN agency could provide LEU to nations whose fuel supply has been cut off by some


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**Protestors (above), including many Western Shoshone tribe members, whose tribal lands include Yucca Mountain, protest the development of the nuclear waste facility. A section of the tunnel (right) at the proposed Yucca Mountain nuclear waste site in Mercury, Nevada.**

dispute with its supplier, except in cases of proliferation violations.

The *Internationalization of the Nuclear Fuel Cycle* report issued in 2008 urges greater development of these models to mitigate proliferation threats: "The United States and Russia should work together on cooperative approaches that would make it possible to enter into fuel-leasing arrangements in which they would guarantee to supply, and to take back, fuel for the lifetime of reactors built in 'newcomer' states, with the fuel taken back to Russia for now, or to the United States as well if circumstances someday make that possible."

The report, noting the pressures of time on climate change and threats of proliferation, urges that there is no time to be lost: "...the implementation of those elements that are feasible today, for example, assurance of fuel supply, should not be delayed while other options are being refined or explored..."

Thus far, however, the so-called "newcomer states" have expressed a reluctance to sign away what is widely seen as their right under the Non-Proliferation Treaty (NPT) to pursue enrichment or other peaceful development of nuclear power. In June, the IAEA's 35-nation governing board, which operates by consensus, blocked a proposal to create an international fuel bank. Even though the proposal was explicit in saying it would not limit the right to enrichment, some countries felt that the fuel bank could nevertheless serve as a first step in efforts to limit their access.

Since 1998, the IAEA has been pressing nations to adopt a so-called "Additional Protocol," providing greater authority to the UN agency's inspection. Currently, IAEA authority under the NPT for compliance inspections requires written notice some days in advance of the visit to a facility and, even then, the host nation can limit inspectors' access to any area they deem off limits.

"There is a real reluctance by some non-nuclear weapons states to accept any sort of increased inspections or restrictions on their use of civilian nuclear power," says Carl Robichaud of Carnegie Corporation of New York. "Even if the Additional Protocol were universally adopted, the inspection regime would remain far from airtight. We are a long way from achieving the sorts of measures, such as near-real-time surveillance, that could really clamp down on potential proliferators."

Henry Sokolski, executive director of the Nonproliferation Policy Education Center, believes that the right under NPT to pursue peaceful use of nuclear power to generate energy does not include the right to any and all nuclear technologies.

"Don't concede that there is a clear, unambiguous, unconditional right to make nuclear fuel," says Sokolski. "The Non-Proliferation Treaty doesn't say that. It says there is a right to develop and produce peaceful nuclear energy...it doesn't say anything about making fuel."

Further, Sokolski argues in *Falling Behind: International Scrutiny of the Peaceful Atom*, published in 2008 and funded by Carnegie Corporation of

New York, that the international community must "Resist calls to read the NPT as recognizing the per se right to any and all nuclear technology, no matter how unsafeguardable or uneconomic such technology might be...This interpretation, if not overturned, will guarantee a world full of nuclear-weapons-ready states. With only a few more such states, the IAEA's ability to detect military diversions in a timely fashion will be marginal at best." He goes on to say, that under current conditions even states without capacity for generating LEU or technology for reprocessing could obtain sufficient stores of uranium to build a nuclear weapon under current IAEA protocols.

And even if the IAEA had the authority of the Additional Protocol, Sokolski and others say it lacks the necessary budget and authority to perform its oversight role.

"We often speak of the IAEA's problems as budgetary, and they are: they don't have the resources to fulfill their mandate. But beyond that, they lack a mandate to conduct robust safeguards and provide genuine confidence against illicit diversion," says Robichaud. "That's because a lot of countries insist on a very circumscribed role for the IAEA."

The IAEA remains the best hope of those working to prevent diversion of civilian materials, Robichaud notes. "As with the United Nations, it's all we've got, and you have to find ways to work within the institution and push for reforms. But we should not be under the illusion that it alone can solve the proliferation risks posed by nuclear energy."

Ultimately, Bunn is optimistic that workable protocols can be developed to enable a safe nuclear revival. He says, "My view is that with appropriate attention to strengthening safeguards, new approaches to the fuel cycle and to a variety of other things, that we can expand nuclear energy quite substantially compared to where it is today with only a modest impact on proliferation hazards and in fact with less proliferation hazard than we have today, if we fix some other things about the proliferation picture."

*There is optimism that workable protocols can be developed to enable a safe nuclear revival.*

This can be accomplished, he says, by engaging the "hard cases," such as North Korea and Iran. He notes the successes that have been realized, for example, in Libya and Iraq, apparently even before the war.

"There's no doubt that we need a stronger safeguard system," says Bunn. "Especially if we're going to have broader growth of nuclear energy around the world...We need to move in the direction of all enrichment plants and all reprocessing plants for plutonium coming under some form of multilateral or international control."

History suggests reasons for optimism, Bunn says, noting that "efforts to stop" nations from going nuclear "succeed more often than they fail." As evidence he says, "There are today in the world more states that launched nuclear weapons programs and then stopped them and are members of the NPT, under inspections, than there are states with nuclear weapons."

### Logistic Realities

Assuming that Bunn's optimism is well placed, and assuming that there is some growth of nuclear energy in coming decades, perhaps enough to retain its current 15 percent global share and 19 percent domestic share of the electricity market, there remain serious questions regarding safe operations and the feasibility of rebuilding the atrophied nuclear construction industry.

Financing, as previously noted, is perhaps the most obvious problem, except in China and Russia, where ambitious nuclear energy development plans are well-financed by the government. Russia and France are both aggressively promoting the idea of "Nuclear Renaissance," hoping to export services despite serious cost overruns and business hardships for AREVA NP, which describes itself as a "company dedicated to the design and construction of nuclear power plants and research reactors, engineering, instrumentation and control, modernization, maintenance and repair services, components manufacture and supply of nuclear fuel," and which is majority owned by the French government.

The most frequently cited bottleneck is in the production of the huge pressure vessels and steam generators used in nuclear plants. Currently, there is only one plant in the world capable of these vast projects, the Japan Steel Works, which already has a two-year wait list for new orders and, even after plant expansion expected to be completed next year, will be positioned to manufacture only eight sets of pressure vessels and steam generators per year.

There are proposals to build other steel works—AREVA plans to expand its Le Creusot forge, China is expected to have its own plant in a matter of months and G.E. is developing a plant in Texas—but this is not an overnight proposition and, based on the "wedge" theory, there would have to be enough steel plants to deliver no fewer than two dozen units a year, starting now and continuing for the next 40 years, if nuclear power is to address climate change; that's four times current global capacity.

Then, there is the need for trained personnel. According to Ferguson, about 2,400 per plant or approximately 2,400,000 operators, engineers, designers, architects and lesser staff positions to build and operate the number of plants envisioned by the "wedge" theory.

One of the many casualties of Three Mile Island was university nuclear science programs, according to Ray Juzaitis, chairman of the Nuclear Engineering Department at the University of Texas. Dozens of schools just shuttered their programs in the years following TMI.

"Now, what we are hoping is that the industry realizes we need research money to fund programs and move forward," says Juzaitis, but so far no one is "stepping up, at least not in a big way."

Twenty years ago, the American Society of Mechanical Engineers certified 400 suppliers and 900 sub-suppliers of nuclear plant components in the United States. Today, those numbers are 80 and 200.

Given the amount of time it would take to rebuild the number of trained personnel and other capacity shortcomings, Juzaitis says, "We'll be lucky if domestically, the nuclear industry can retain its current share of the U.S. market."

On a global scale, operational plant safety remains a serious concern. Bunn summarizes the problem clearly: "One of the obvious issues on both security and safety is what about the newcomer countries, who are building nuclear power plants for the first time and haven't got experience in regulating them and operating them? Or what about countries that are so rapidly increasing what they had before that their nuclear infrastructure, their regulatory infrastructure, might not be able to keep up or they might be training new people so fast that they're not as good and as experienced as they should be? Countries like China and India are obvious ones that are building like gangbusters at this point, and people worry about whether they will cut corners to get these power plants up and running."

*For many of the world's nations, nuclear power is more than a practicality: it is viewed as a source of national pride.*

While many Asian countries—where more than half the 31 nuclear plants currently in development worldwide are located—have demonstrated good safety records, there are questions about how well Thailand or Vietnam will succeed.

Or consider other nations contemplating nuclear power, some of questionable national stability and regulatory excellence: Iran, Israel, Jordan, Yemen, Saudi Arabia, Oman, United Arab Emirates, Qatar, Bahrain, Oman, Belarus, Turkey, Azerbaijan, Bangladesh, Malaysia, Indonesia, Venezuela, Morocco, Tunisia, Libya, Egypt, Nigeria, Algeria and Ghana.

The United Arab Emirates has retained American consultants to assist in building government-oversight protocols for its nascent nuclear power industry. But, there are those who question best practices as embodied in the Nuclear Regulatory Commission (NRC) and those of other heavily nuclear-powered nations.

"The NRC still has some dedicated, honest professionals," says Lovins, "But I'm afraid they're sufficiently subordinated to political appointees who think their job is just to keep plants licensed and running that we're in for another accident. And my friends at the French atomic energy commission say they've got the same problem and they'll have the accident before we do."

In particular, critics of the NRC point to the 2002 incident at the Davis-Besse nuclear reactor outside Toledo, Ohio, where the NRC shut down the plant just weeks before its reactor head nearly blew apart, placing it in imminent danger of losing cooling capacity and a likely core meltdown. The NRC claimed that the plant operators, FirstEnergy Corp., had willfully neglected to provide NRC with accurate data. FirstEnergy paid $33.5 million in civil and criminal fines associated with what prosecutors called one of the nuclear industry's biggest cover-ups.

Although critics argue that the NRC bears some culpability for lax oversight, Lowenthal makes the case that "the NRC did eventually have them shut down, demonstrating that the NRC does have the necessary authority, but do other nations have as much authority?"

Clearly, the most daunting problem facing the nuclear power industry, one which will only be exacerbated by any future expansion of its capacity, is the failure to resolve the waste issue, which persists 50 years after the U.S. National Academy of Sciences recommended stable deep geological repository as the only rational means for disposal of waste.

While "geological disposal is very widely accepted in the nuclear community as technically feasible and adequately safe," according to von Hippel, progress has been stymied by a NIMBY (Not In My Backyard) mindset in most countries.

Congress authorized billions of dollars in the development of the Yucca Mountain, Nevada site since 1987, with a projected completion date of 1998, yet fierce opposition, most notably from Senate Majority Leader Harry Reid, has delayed completion. Early in 2009, Reid won the support of the Obama White House to continue stalling final approval of the project.

Finland and Sweden have had greater success, attaining community buy-in for repository sites, which are slated to open around 2020.

Yet, presently, there is not a single repository, which means that spent fuel—typically, about 20 tons per year per plant—is stored onsite at nuclear plants, initially in water inside a secure containment building and later transferred, in ten-ton loads, to secured 100-ton concrete casks. The casks cost about $1 million to $2 million each and are expected "to remain intact indefinitely," according to von Hippel.

The Bush administration promoted a Global Nuclear Energy Partnership which, as part of a fuel-cycle program, intended to restrain "newcomers" from seeking uranium enrichment or reprocessing technologies, would supply fuel and take back the spent fuel for reprocessing, storing the waste from that process in domestic geological repositories. But the plan showed little chance of being economically feasible and lost congressional support.

"With regard to proposals for reprocessing, I have a counter proposal," says von Hippel. "Postpone it. As practiced today, reprocessing and plutonium recycling are not economical and do not simplify spent-fuel disposal... reprocessing costs about ten times as much as interim storage of spent fuel in dry casks."

### Greater Controls

Accepting the reality that outside of China and India a "Nuclear Renaissance" is unlikely, then the question becomes, of what value is a "Nuclear Revival"? Can it fully address the triple threat of dependence on Middle East oil, a doubling in demand for electricity and dangers associated with global warming?

"Is nuclear the panacea? No it can't be, you have to develop an across-the-board approach, including clean coal, wind power and solar and then nuclear becomes part of a broader solution, and yes, that will involve government subsidies for many of these energy programs," says Juzaitis of the University of Texas.

For most of the world's nations, however, nuclear power is more than a mere practicality; it is viewed as a potential source of national pride, a demonstration that they are serious players in the global economy But is it an acceptable bargain for the world community to see Iran or Yemen asserting the perceived right under the Non-Proliferation Treaty to peaceful use of nuclear energy? That would seem to be an unlikely scenario without a firm sense of security, which can only be created with far greater international cooperation than currently exists.

As an example of how complex these enforcement regimens must become, Bunn points to the network operated by A.Q. Khan, the rogue Pakistani nuclear scientist, who introduced nuclear weapons capacity to North Korea. Says Bunn, "Key components of centrifuges were being manufactured in Malaysia and then lots of things were being put together and integrated in Dubai. Nobody had ever really thought seriously about nuclear export controls in Malaysia or Dubai before because they didn't have the nuclear technology that people were worried about. But in an age where precision-aided manufacturing can allow you to make these components practically anywhere, we need stronger export controls everywhere. And we haven't got them yet. And we need expanded police and intelligence cooperation internationally because these networks are global and so the police and intelligence people trying to combat them need to work together globally as well. Finally," he continues, "and absolutely critical to getting any of the rest of this done, the nuclear weapons states need to live up to their end of the bargain. There is no way that the United States and Russia and other countries can get the non-nuclear weapons states of the world to sign up for stricter export controls, tougher inspections, more enforcement and so on, if we aren't about to accept any extra constraints on our own nuclear activities."

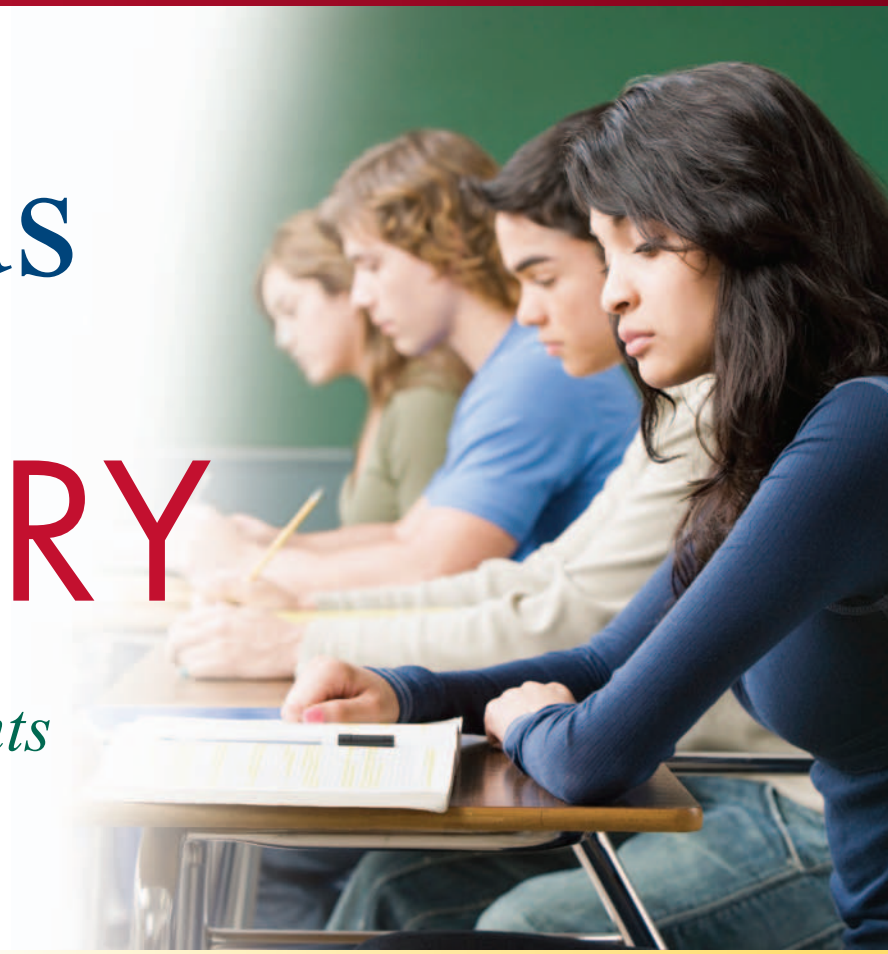
This is pretty much the same gospel that Sam Nunn has been invoking for years: The United States, Russia and the rest of the "haves" must accept the same terms as the "have-nots."

And even then, says Nunn: "In terms of deployment of these nuclear power facilities, it's not going to be a rapid development and, ultimately, for climate change, it's not going to be a magic bullet." ■

by Karen Theroux

# Standards for a NEW CENTURY

## *Educating U.S. students to compete in the global economy*



CORBIS

*Finally – America is preparing to flip the switch from mostly local control of education to nationally aligned Common Core State Standards. These evidence-based, internationally benchmarked guidelines have the potential to transform teaching and learning across the United States, allowing students access to higher education and economic success. It's a momentous change that could mark the beginning of the end of a long battle over who decides what is taught in the nation's classrooms, and the start of broad public support for the rigorous, unified approach needed to move the nation's education system forward.*

American public education as we know it began in the nineteenth century, when states mandated the formation of local school districts and school boards that, for the most part, determined the actual content of schooling. In recent decades, states have been exerting more influence by setting academic standards, which outline what students should know and be able to do in each grade. Local districts and school boards are responsible for implementation, and property and state taxes foot most of the bill. But state standards mean 50 different sets of requirements, and Americans have lately lost patience with the irrationality and inconsistency of this outmoded system.

Now change is on the way via reinvented fundamentals known as Common Core State Standards. Initiated by education reformers and driven by collective state action, this movement is gaining momentum as evidence mounts that the nation's education system can't meet twenty-first century demands. Going forward, when states adopt the new standards (initially in math and English, then in science and history), it will become possible to align curriculum and assessments and to measure student learning uniformly across the country, an improvement education leaders strongly support. They envision the new standards having a dramatic impact on teacher training and professional development, as well as on instructional materials and classroom assessments.

### Why Change Now?

The time is right for transformation, according to many in the edu-

cation community, with state-based action already under way, and financial incentives from the federal government fueling the process. Education secretary Arne Duncan says we are experiencing the "perfect storm for reform," a significant and historic opportunity at a time of economic and education crisis. Just as families today are hurting, many of the nation's schools are also struggling, he says, losing young people to the streets or graduating students who are not ready for college or work. Budget cuts place schools and children even more at risk. Duncan sees signs of hope amid these crises; the Obama administration is focused on education reform, particularly on the upgrading of standards, and there is support from the leadership on Capitol Hill plus the realization that there are proven strategies that work in the classroom.

Even more significantly, for the first time in history the secretary of education has money, lots of it, to fund school reform. The American Recovery and Reinvestment Act of 2009 (ARRA) provides more than $100 billion for education, plus several billion more in a Race to the Top fund for states that move fastest and furthest. This fund provides competitive grants to encourage and reward states laying the groundwork for education innovation and reform. To qualify, states must implement ambitious changes outlined in the economic stimulus package, adopting internationally benchmarked standards and assessments; recruiting, developing, rewarding, and retaining effective teachers and principals; building data systems that measure student success and inform teachers and principals how they can improve their practices; and turning around the lowest-performing schools.

Getting here has been anything but easy. There's a history of attempting to create national standards, but never with any success, according to Mike Cohen, president of Achieve, an independent nonprofit organization created by the nation's governors and business leaders, and dedicated to accomplishing education reform through collaboration. One reason we are moving toward common state standards today, Cohen says, is that they are very different from earlier national versions, and in very important ways. For one thing, the new standards aren't coming down from the top—the kiss of death for previous attempts. In the 1980s, for example, when George H.W. Bush proposed voluntary American Achievement tests to be used across the country, "Democrats didn't like them because the idea came from a Republican. And Republicans did not like the feds involved in education. Consequently, they went no place," he contends.

Early on, the Clinton administration tried another tactic with the Goals 2000: Educate America Act, signed into law by the president in 1994, giving grants to states and setting up a federal structure for a new round of national standards. But in an intensely partisan era, this program too ran into a wall of Republican opposition. "States were simply against ceding control," Cohen says. "State education commissioners didn't like or trust the federal government, and the governors were also wary of the feds. In a nutshell, there was a lot of opposition. It became just another losing battle in the culture wars." In his second term, President Clinton proposed voluntary national tests for fourth-grade reading and eighth-grade math aimed at giving parents and teachers the tools to improve education firsthand. The tests were to be based on the accepted frameworks of the National Assessments of Educational Progress (NAEP), commonly known as the nation's report card, which have been in use since the 1970s. But unlike NAEP, which is given to a representative sample of students, the voluntary national tests would yield individual scores. "The same people objected, claiming that tests that were voluntary today could become mandatory tomorrow," Cohen says, adding, "It's no wonder national standards are still considered a political third rail."

*The Obama administration is focused on education reform, particularly on the upgrading of standards, and there is support from the leadership on Capitol Hill plus the realization that there are proven strategies that work in the classroom.*

Next came President George W. Bush's No Child Left Behind Act (NCLB) early in 2002, authorizing a number of federal programs aimed at improving school performance. States were required to participate in Annual Yearly Progress reports and to give students standardized tests that would dem-

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onstrate steady gains every year through 2014, when all students were expected to be "performing at or above grade level." Soon after NCLB was launched, the RAND Corporation (a nonprofit that conducts research to help guide public policy) published a report for Carnegie Corporation comparing NAEP literacy scores with state achievement test results. According to the RAND study, appropriately titled *Achieving State and National Literacy Goals, a Long Uphill Road*, many states had significant gaps between the two sets of scores, indicating the 2014 benchmark would be difficult to reach.[1]

RALPH ALSWANG

**Secretary of Education Arne Duncan with Amar Ramroop, a 12th grade student from Hillcrest High School, New York City and Ericka Davis, a 9th grade student from Friendship Collegiate Academy, Washington, DC.**

Under the No Child Left Behind Act, states that failed to meet benchmarks would be subject to penalties, including loss of federal education funding. At the same time, the federal government mandated that National Assessments of Educational Progress be administered to small groups of students as a means of comparing different state tests across the country. While NCLB has an as yet unknown future, it is this comparative testing requirement that some say has led to today's common standards movement, by exposing wide variations among states.

The requirements of NCLB give the federal government an expanded role, but still allow states to determine their own measures of proficiency. Since required tests are created and administered by each state independently, almost every state has ended up with its own set of standards and assessments. This approach has forced states to spend money on generally poor quality assessments, at the same time incentivizing shallow instruction and "teaching to the test." Some states have even been able to "game" the system to get what look like better results. Consequently, the scores states use to determine proficiency vary widely, with some setting the bar at 50 percent and under, often below the most basic level on the NAEP. In short, the very concept of standards-based reform on which No Child Left Behind is based has been seriously undermined.

"Since NCLB makes no mention of national standards, and at the same time requires more frequent NAEP participation, it's possible to compare results state-by-state and issue report cards," Cohen explains. Deviations in the rigor and quality of state standards are obvious, as is the lack of agreement on what standards are supposed to do. "It's a red flag when the two sets of scores don't match," says Cohen. "State test scores way above the NAEP scores are a guaranteed news story that gets a lot of attention. These gaps in state performance are indefensible: Obviously states have lowered the bar. And this information has built up lots of interest in the need for a more uniform set of standards and assessments."

Achieve was one of a number of influential organizations to bring this issue to the attention of the public and policymakers. Consequently many governors and state education chiefs have embraced the need for change and are working steadily toward alignment. "You can see this as a state-led effort for common core standards, which the feds have had nothing to do with," Cohen stresses. "It's all being done by the states." He sees state-based action as a big reason for optimism and believes real change is underway. As a step forward, in 2008 the National Governors' Association and the Council of Chief State School Officers, in partnership with Achieve, published the report, *Benchmarking for Success: Ensuring U.S. Students Receive a World-Class Education*, to provide state policymakers with a roadmap for aligning their K-12 education systems with those of top-performing nations.

Although states had already taken the lead in developing their own standards-based education, they lacked the tool of international benchmarking, which was critical to advancing the agenda. This report helped to make the case for the development of the Common Core State Standards Initiative (CCSSI), by providing

[1] *Sloan, J. M., Kirby, S. N., Barney, H., Darilek, H., Magee, S. (2005).* Achieving state and national literacy goals, a long uphill road. A report to Carnegie Corporation. *Santa Monica, CA. RAND Corporation*

data to allow states to compare the strengths and weaknesses of their education system with other countries. It also identified best practices, which were incorporated into a comprehensive action plan for achieving world-class education for American students. As of August 2009, 47 governors and chief state school officers had made a public commitment to support the CCSSI under the joint supervision of these two organizations. Many in the field say it's not a moment too soon.

JASON MAZZA, NEW VISIONS FOR PUBLIC SCHOOLS

**Graduates of Marble Hill High School for International Studies, Bronx, New York, a New Visions partner school ranked number four in New York City in 2009.**

## Making It in the Global Marketplace

Americans today are faced with an increasingly competitive and interconnected global marketplace, making the need to educate the next generation to higher standards more critical than ever before. In the flattened global economy of the twenty-first century, students in Alabama, for example, are competing for good jobs against their neighbors in Tennessee or Massachusetts, just as they are against students in South Korea and India. Yet the U.S. public education system is ill-equipped to face this escalating challenge. Once considered the best in the world, it is now in the middle of the pack, even though the United States spends more than most other countries on its schools. Millions of students, particularly those from underserved and immigrant communities, graduate from high school unprepared for college and careers. While low student performance can have many causes beyond the classroom, Secretary Duncan believes that the education system must take the lead in increasing learning and reducing inequality if we are to avert "a national crisis that is rapidly creating an entire class of Americans who are unable to share in the benefits of a modern, progressive and productive society."

"Our school systems and school designs were built for the middle of the last century, when we were trying to get everybody through high school," explains Michele Cahill, Carnegie Corporation vice president, National Programs and program director, Urban Education. "We still need to get everybody through high school, but in much more rigorous ways. Then there was a labor market for high school graduates. Today the world has changed; the school system hasn't changed for it. We have to have higher expectations for our young people."

While the power in education still resides in local district offices, school boards, teachers' unions and community-based advocacy groups, the federal government's influence has increased, largely because of the incentives available through stimulus funding. The standards-based reform movement has gotten a boost from organizations representing a broad ideological spectrum, including the Hunt Institute, founded by James B. Hunt, past Democratic governor of North Carolina and the Thomas B. Fordham Foundation, a conservative think tank led by Chester Finn, former education department leader in the Bush administration.

Also part of this movement are a number of education organizations working within the public and private sectors to measurably improve teaching and learning and raise the level of student achievement, as the nonprofit New Visions for Public Schools is doing in New York City. These reformers promote school transparency and accountability along with rigorous standards, and emphasize access to high-quality student data from effective assessments to determine what is actually being learned.

Agreement on an unprecedented scale has moved the agenda forward. Reform groups, collaborating with governors and state commissioners of education, have reached consensus on two critical points: (1) new standards would lead to important economies of scale in curriculum development and assessment while (2) making the United States competitive in the knowledge economy today and in the future. Simply put, if a state doesn't

adopt new, more rigorous standards, its students will be left behind, and if too many states opt out, the whole country will be left behind. Either U.S. schools must change for the better—or our economic position will only get worse.

"We've known there are problems in American education since *A Nation at Risk* came out in 1983," says Dane Linn, director of the National Governors Association Education Division, Center for Best Practices. "State achievement data were even worse then. But there are a couple of good reasons why the notion of states coming together on the standards issue is more palatable today than it was 20-plus years ago," he explains. "With graduation rates, dropout rates and minimum achievement gaps not getting any better, more state officials are working toward closing those gaps and raising the graduation rates, which has led governors to conclude the standards work is theirs to do. In addition, there's the surprising academic progress of countries like Poland—which continue to ascend while we remain stagnant—and for a governor this is a real driver toward internationally benchmarked standards," he says.

Poland is only one example among many countries to have made noteworthy progress in education, according to the Program for International Student Assessment (PISA).[2] PISA compares high school students' capabilities in reading, mathematics, science and problem solving. In its latest figures, released in 2006, the United States ranked 25th in math and 21st in science achievement out of 30 participating countries, behind Finland, Korea, Ireland, Hungary and Canada, among others. In the previous round of tests in 2003, U.S. students placed 15th in reading and 24th in problem solving skills. In addition, America's education system does an inferior job of providing equal learning opportunities for students of varying socioeconomic backgrounds, while other countries have proven disadvantaged students need not perform poorly in school.

Unless the United States can eliminate these disparities, prospects for international competitiveness are grim. But Secretary Duncan has made it clear that this administration is eager to act as a catalyst to reform, vowing to eliminate the extreme variation in standards across America. Accordingly, the federal $4.35 billion Race to the Top fund will be used to create incentives for states to take meaningful steps toward improving standards. Of that total, $350 million is committed to creation of rigorous assessments linked to the internationally benchmarked common standards being developed by states. "Just to be clear, the federal government cannot 'mandate' standards because the constitution does not include national education as one of its priorities," says Andrés Henríquez, Carnegie Corporation program officer managing the work in literacy, standards and assessments. "However, incentives such as the Race to the Top and the fund for new assessments are in place to assist states with the adoption of the standards."

"Our ultimate goal is to prepare students for the world they're going to face," says Gene Wilhoit, executive director, Council of Chief State School Officers (CCSSO). He's encouraged by recent progress, but not ready to believe that all Americans recognize the need for international competitiveness. "There are still concerns that not enough parents understand the consequences of *not* taking action," he stresses. "There's a tendency to say 'things are okay...my high school's just fine. This is true even with today's dramatic economic shift." He says it often takes "water in the face" to bring about change on this scale. "We need to keep talking to communities because we're not there yet. There's no groundswell of demand that we upgrade to world class education."

## Fewer, Clearer, Higher

With so much at stake, how will the new standards work—and work better? The existing standards, which vary considerably in terms of their content and rigor, form the basis of today's curriculum and assessments. They also drive the quality of teaching and set the bar for high school graduation. "The problem with most existing standards is that they are consensus documents," says Sally Hampton, senior fellow for literacy at America's Choice, an organization dedicated to improving public education. Hampton, who is directly involved in developing the new core standards, says existing sets of standards are "too long for one teacher to cover in one year. You might brush by them, but it's impossible to teach from them." Typical content standards have been compiled by committees of experts all pushing their own ideas of what matters most. "The problem is that when you try to honor everyone's ideas, you end up with a lengthy list," Hampton says. "That's not what we're doing. We are simply laying out what students need to know to walk into college or the workplace."

The new Common Core State Standards will provide the framework for a widespread understanding of how educators can best help students in all groups, from struggling to advanced, master academically rigorous content and acquire essential skills. *Fewer, clearer and higher* standards aligned to more sophisticated assessments will establish the conditions for a new generation of improved instructional

[2] *PISA is part of the Organization for Economic Cooperation and Development (OECD), an intergovernmental association of industrialized countries. (www.pisa.oecd.org)*

tools—or so the theory goes.[3] The standards will tell teachers and principals what their students are supposed to learn, and longitudinal performance data will show whether they're learning it over time. Students and their parents will know what is expected and will be able to set appropriate academic goals.

The National Governors' Association and the Council of Chief State School Officers have high expectations for the new guidelines, which they insist must be aligned with college and work expectations in order for all students to be prepared for success in the twenty-first century. The standards being hammered out by their joint initiative will set the stage for U.S. education not just next year, but for the next decade, and will not lower the bar, but raise it nationwide. These higher benchmarks will define the rigorous skills and knowledge that must be effectively taught and learned for students to handle credit-bearing, college-entry courses and workforce training programs, and to compete with students from around the world.

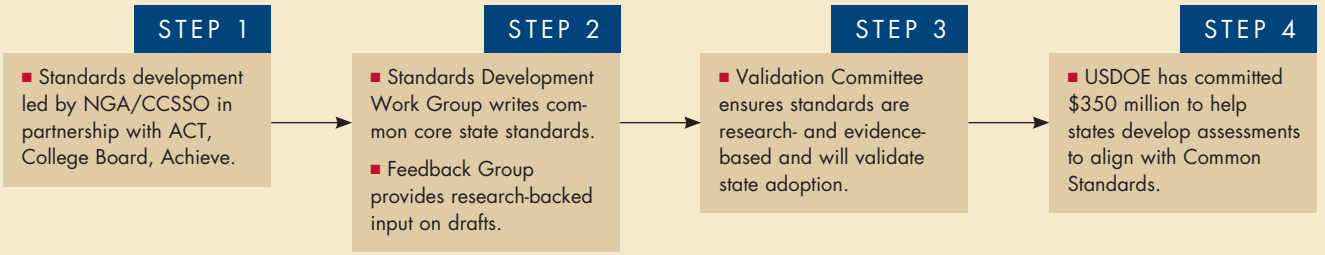
What is adequate preparation? According to the Common Core Standards Initiative, it means deep conceptual understanding through application of content knowledge and skills to new situations; students will be expected to demonstrate reasoning, justification, synthesis, analysis and problem solving. The standards aim to provide sufficient guidance and clarity so that they are teachable, learnable and measurable, while also being reasonable in scope and instructionally manageable. They must convey a unified vision of the big ideas and supporting concepts within a discipline, and reflect a progression of learning that is meaningful and appropriate. Finally, they must be clear and understandable not only to students and teachers but to parents and the general public.

"The big improvement in the new standards is that we are using evidence as our guide," says Dane Linn. "These new standards will be fewer, clearer and higher because we are being true to the evidence of what works." Linn agrees that state standards in place today can be hard to discern, teach and demonstrate. In contrast, he says, "one cannot read these new standards without understanding performance, and standards cannot exist unless performance is measured. That means we need assessments that go way beyond coloring in bubbles. Our goal is to develop common assessments that tie directly back to the core; that require students to integrate math and science and apply concepts in real world situations." Linn foresees that these changes will have a huge impact on teacher training and professional development as well as on instructional materials, which will encompass both digital media and traditional texts.

## College Knowledge

A number of national education organizations have been working in this area, some with Carnegie Corporation support, and have provided vital information and guidance leading up to the actual writing of new standards. Achieve, ACT and the College Board are partnering in the NGA /CCSSO Common Core State Standards Initiative throughout the process, which began with a national forum on content, followed by the development group's writing of the first draft—a process that took place behind closed doors with two expert committees, one for math and the other for English. Backing up their work is a body of research and evidence from partner organizations and from high-performing states and countries. "All the members of the group have experience working in standards and assessments," says Sally Hampton. "We came together having looked at state and international standards, and held a series of two-day meetings followed by two-hour

### Process for Developing Common Standards and Assessments




[3] *The call for "fewer, clearer, higher standards" was articulated in a white paper prepared as background for the Carnegie Corporation and Institute for Advanced Studies report* The Opportunity Equation. *See Coleman and Zimba,* Math and science standards that are fewer, clearer higher to raise student achievement at all levels *http://www.opportunityequation.org/resources/commissioned-papers/coleman/*

phone calls twice daily, so really we're working constantly."

Hampton reports that the group reviewed mountains of research on what's essential for students to know to successfully enter college and the workplace. They also reviewed attempts by other national systems to identify the essentials in order to ensure the new U.S. standards will be just as rigorous. The team wrote a first draft and sent it out to respected content experts for early reviews, then made revisions and sent it out again—a process that would be repeated several times. "All the comments from organizations, states, teachers and other experts have been wonderfully helpful...opening windows and making us consider new ideas," she says.

*Assessments and standards are inseparable, and innovation in testing and accountability is critical to transforming the education system.*

The standards being created now stipulate "not so much what you need to know, but what you need to be able to *do*, skills you *must* have to be successful," she stresses. "We included an excerpt from a college level science text because students have to handle work this difficult in order to walk into an entry level college course," she explains. "In general, kids are not prepared for the amount and level of reading they must do. Many who go to college are overwhelmed by the quantity of what they are assigned. They do not have 'college knowledge.' We also included a workplace document, because technical manuals today are highly complex, and entry-level workers need to be able to succeed without remediation. We want them to be able to get jobs and advance their careers," she says. "The levels of work we've included are really going to surprise some people."

The draft standards for math and English language arts were made available for comment by the education community in mid-July 2009, and the first official public draft was released on September 21, 2009, as this article is being written.[4] These initial standards documents do not specify skills and knowledge requirements by grade level (refinements that will come later), but indicate basic concepts and principles along with exercises and explanations. The English standards provide exemplary texts (more were added between as the drafts were refined), and the math standards have accompanying performance tasks, or sample problems. At the next round, a Feedback Group will help shape revised drafts and an independent Validation Committee will confirm the final standards are research and evidence based. The resulting internationally benchmarked standards will then be ready to be adopted. States that adopt the standards have consented to let them represent at least 85 percent of the state's standards in math and English. The remaining 15 percent offers a degree of freedom to local decision makers—an opportunity to innovate and potentially move beyond what the new education standards require to even higher levels of achievement.

"While in some states the fewer, clearer and higher standards may be welcomed, the standards may not sit well with all states," Henríquez points out. "States like Massachusetts, known for rigorous standards that are closely aligned to their state assessment system, have already spent time and resources to rewrite their standards. So will these new standards be high enough for the state or might they feel like they're backtracking?" he asks. The flexibility to exceed the common standards is important to states on the high side of the achievement gap, which already outperform many European countries, and intend to maintain existing levels of excellence.

Assessments and standards are inseparable, and innovation in testing and accountability is critical to transforming the education system. Yet creating new assessments will be costly—particularly the type of deep and nuanced assessments that the new standards will demand—and experience has shown a general unwillingness in the United States to invest in developing and administering high-quality tests. Some states have already joined together to share resources and develop common assessments. Partnership makes sense because it distributes some of the political and financial burdens of creating and updating curricula and tests, freeing up scarce state resources for other needs.

In fact, willingness to work in consortia will be considered a plus when individual states apply for Race to the Top funding, according to fund director Joanne Weiss. States are being encouraged by Secretary Duncan and his team to think about coming together in broad coalitions to define a unified state effort around ambitious reforms, Weiss explained to an education stakeholders forum in August 2009, as a means of "using the money in the most impactful way to really drive student achievement gains." She told forum

*(Continued on page 36)*

[4] *First Official Public Draft of the College- and Career-Readiness Standards can be seen at: http://www.corestandards.org/*

ASSESSING

# "College Knowledge"

## *Why a new approach to testing is critical to transforming U.S. education*

David T. Conley, University of Oregon Professor of Educational Policy and Leadership is the founder of EPIC, an educational research organization receiving Carnegie Corporation support for work in improving educational assessments. We asked him to explain why assessments matter, what problems he observes in current practices and what he recommends for the future of testing.

*Developing new assessments is very expensive. What's wrong with the tests that have already been bought and paid for?*

It's not what you know, it's what you do with what you know that matters most. The two aspects of cognition are interconnected, yet most standardized tests measure only memorized information. The current testing model is based on psychometrics from the 1920s. We know much more about human intelligence than was known then. It's not one-dimensional, it's multidimensional, and that means we need more sophisticated measures. Better assessments are essential for providing a more complex, authentic demonstration of knowledge—the only definitive way of determining whether students have mastered the necessary skills to succeed in college or at work.

*If students aren't tested on acquired facts, what skills will they have to demonstrate instead?*

We have identified key cognitive strategies that are more important for college success than specific content knowledge taught in high school. Examples are analysis, interpretation, precision and accuracy, problem solving and reasoning. Writing is probably the single most important academic skill and encompasses other competencies such as conducting research, supporting arguments with evidence and thinking deeply about an idea. Math is a means to an end: Simple math problems are not equal to problems found in economics or population dynamics, for example, so we have to figure out how to use it in other contexts, which would include business functions such as cost/benefit analysis.

*With all the emphasis on assessment, won't teachers be more likely to teach to the tests?*

Since the best tests drive the best teaching, in this case it's not a bad thing. In other words, good assessments can teach teachers to teach better. Assessments can set the bar for what students must master, and course content is directed toward reaching that established goal. It's important to recognize that to teach an intellectually challenging class, teachers must be properly prepared and equipped with the understanding of their subject area necessary to evoke the desired responses to material in students. Teacher support ideally takes the form of professional development activities in which they learn to focus curricula on key ideas and supporting concepts and to incorporate techniques that enable students to develop key cognitive strategies.

*Will the new standards and assessments mean even more frequent testing for kids, who already feel like they're being tested all the time?*

That depends on what you mean by testing. If every test they take could be a three- to five-page research paper, that's the same as what students should be doing anyway in order to master the material. This deeper type of testing is more reflective of how the brain uses information. In a way, it represents going back to the way things used to be, a more practical approach to becoming successful at different tasks, like in the apprentice-journeyman system. Prep schools do what we're talking about now. But the kids who don't have those advantages and who need this method most, when they get to college they get completely killed. College and career readiness is more complex than they think: it's also self- and time- management. Most students don't know how to do anything with what they've learned. There's no connection between synapses. We need to figure out how to keep knowledge coming and put it to use.

*So are you predicting the end of typical "coloring in the bubble" tests?*

I hope so. It's a large investment. If we believe there's a problem, if we believe present methods are limited, we have to be ready to embrace new models. Current test forms do produce uniformity, but it's the illusion of something, not a real measurement of deep knowledge. We need a balance between consistency and the quality of what is measured. Right now all students get the same type of assessment and we mark progress by getting one or two more questions right. But the improvements we're getting are not proportionate to our efforts. I maintain change may not be as difficult as people think. For instance, we can use technology and put more information online to achieve better training for test raters. We already have models we can build on. More importantly it can be done much more efficiently. The cheapest way is not always the best way; lasting impact is a better investment.

*For more information on college and career readiness go to http://www.epiconline.org/publications*

*Continued from page 34*
attendees to expect word of a "separate competition to help states that are in consortia around developing a new set of common standards, to also develop the assessments that go with those standards. We have set aside up to $350 million to support that," she added.

A good example of the type of partnership advanced by the Education Department was formed in 2005 by Vermont, New Hampshire and Rhode Island, with Maine joining in 2009. The New England Common Assessments Program (NECAP) is a series of reading, writing, mathematics and science achievement tests established through collaboration of these states' departments of education. The NECAP tests, administered annually, measure students' academic knowledge and skills relative to grade level expectations, with scores reported at four levels of academic achievement. An important goal of the partnership is to make these assessments instructionally relevant by providing data to school administrators, teachers and parents to help them make informed decisions about student instructional needs.

Michael Hock, director of assessment for the state of Vermont, confirms that financial issues were the driving force behind the partnership. "We went into this because none of the states had any money," he says. "But after we got into it, our assessments were much better quality because of cross-pollination. We thought it was only about money, but really it ended up being about quality." Hock says the three original partners all used good assessments to begin with, but couldn't afford to meet No Child Left Behind requirements individually. "We needed to make it work, and we worked hard to make the collaboration successful and to keep up the quality." It takes the right kind of people and the right content to succeed at collaboration, he says. NECAP encourages teacher involvement, which he sees as promoting test fairness, and NECAP meetings are held several times a month to ensure end products are acceptable. A lot of thought goes into how things are run, according to Hock, which is vital, since the "standards have no meaning without tests."

Some experts are hopeful that the recent economic downturn will encourage greater collaboration. But would partnerships work everywhere? "We had a sense that our states were more alike than different," Hock explains. "I don't know if it would work the same way for Arizona, for instance. We have to think a lot about governance; how do you make decisions that are as fair to the least equipped as to the most equipped schools? Vermont is the smallest state: Should we count less on that basis? If states want to form partnerships, "don't go into it wide-eyed," he advises. "You have to know how to resolve conflicts, and it's not easy. But I would love to think people can do it."

### Hurdles Ahead

Crafting common state standards is only the first step in transforming the U.S. education system. States still must adopt the new standards, and adoption is voluntary. So far the federal government, Secretary Duncan specifically, has stuck to the cheerleader role, cautiously leaving state leaders to make the final decisions. But Achieve's Mike Cohen says that he and others are watching closely what happens with Race to the Top funds. "The message is, 'If you want to be eligible for the second round of money, demonstrate that you have adopted the standards.'" So we're watching," he says. "It's a very fast timetable for adoption. A lot of money is at stake."

Each state will apply its own process to coalition building and adoption, according to its own timeline. In states that do adopt the common core standards, educators will need resources, tools and time to align classroom practice to the new requirements. Instructional materials that adhere to the standards will have to be developed, along with assessments to measure student progress. Federal, state and district policies must be examined to determine how well they support the alignment of the common core with student achievement. While progress to date is impressive, there are still several crucial issues at play, and in these areas Carnegie Corporation's National Program is making some of its most significant investments to help move the nation's agenda: Enhancing human capital practices by providing more effective data-driven professional development, so that rigorous standards are a tool, not a punishment; recruiting and building a teacher talent pool; inventing new school designs to be responsive to new standards. These are all critical parts of the common standards effort. With 43.5 million children, roughly 87 percent of the student population, affected by the change, the stakes are high. And as NGA's Gene Wilhoit cautions, "As difficult as coming together has been, the road ahead will be even harder."

The Obama administration has made no secret of the value it places on education reform, or of its expectation that needed changes will be made. The president put it this way in a speech last spring: "In a twenty-first century world where jobs can be shipped wherever there's an Internet connection; where a child born in Dallas is competing with children in Delhi; where your best job qualification is not what you do, but what you know – education is no longer just a pathway to opportunity and success, it is a prerequisite....So let there be no doubt: the future belongs to the nation that best educates its citizens – and my fellow Americans, we have everything we need to be that nation." ■

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# The OPPORTUNITY Equation

## *Mobilizing to Transform Math and Science Education*


**Arne Duncan, Secretary of Education, commended the Commission's report for proposing fewer, clearer and higher state standards for what students must learn.**


**Michele Cahill, Co-chair of the Carnegie Corporation of New York-Institute for Advanced Study Commission on Math and Science Education and Vice President, National Programs and Program Director, Urban Education of Carnegie Corporation.**

Many of the nation's most influential education leaders gathered on June 10, 2009 at the Newseum in Washington, D.C. to kick-off a national mobilization to achieve higher levels of math and science learning with the release of the report, *The Opportunity Equation: Transforming Mathematics and Science Education for Citizenship and the Global Economy*.

The report was produced by a blue-ribbon commission of experts convened by Carnegie Corporation and the Institute for Advanced Study, once home to such luminaries as Albert Einstein, Abraham Flexner and L. Robert Oppenheimer. It specifies who needs to be involved and clearly illustrates the roles various sectors must play if we are to ensure all students—no matter where they live, what educational path they pursue, or in which field they choose to work—have the knowledge and skills they need in science, technology, engineering, and mathematics upon high school graduation. The report has elicited the support of nearly 70 groups who have affirmed their willingness to work together to place math and science at the center of education innovation, improvement and accountability.

"The president has issued a call to action for American students to move from the middle to the top of the pack in science and math over the next decade," said U.S. Education Secretary Arne Duncan, who spoke at the event. "The report released today offers a plan for our students to get there." In his endorsement of The Opportunity Equation, Duncan underscored the importance of the report's key recommendation of "fewer, clearer and higher" state standards establishing what students must learn.

Advocating for "career-ready standards" is a vital first step, he said. "We've had 50 states doing their own thing," on standards and assessments resulting in a system that is essentially "lying to parents" about how well prepared their children are for college and careers. A single, national high bar of achievement, for which all students must aim, and a willingness to get honest about under-performing schools will be necessary to transform math and science education, he said.

In response to Duncan's and others' remarks, Representative George Miller (D–CA), who chairs the House of Representatives committee responsible for reauthorizing the current federal law governing elementary and secondary education, known as No Child Left Behind, said "I'm taking notes."

Elected officials, labor leaders, education entrepreneurs, business leaders and others with an interest in transforming math and science education highlighted transformative work that is already having an impact on student achievement. Nobel Laureate Harold Varmus, president of Memorial Sloan-Kettering Cancer Center and chair of the Presidential Council of Advisors on Science and Technology, noted that nearly every recommendation offered in The Opportunity Equation "has been tested somewhere and has been found feasible and beneficial."

"We know how crucial it is to train not just a new generation of prize-winning scientists but also technically skilled people" like educators and citizens whose contributions may be less visible but essential to our political, ethical and social well being, said Varmus.

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**(Left to right) Hon. Donald L. Carcieri, Governor of Rhode Island; Randi Weingarten, president of the American Federation of Teachers and the United Federation of Teachers; Lydia Logan, Executive Director of the U.S. Chamber of Commerce's Institute for a Competitive Workforce; Norman Francis, President, Xavier University of Louisiana; Uri Treisman, Executive Director, Charles A. Dana Center; and Carina Wong, Deputy Director, Education, U.S. Programs, The Bill & Melinda Gates Foundation.**

**Nobel Laureate Dr. Harold Varmus, president of Memorial Sloan-Kettering Cancer Center and Carnegie Corporation president Vartan Gregorian.**

**Teach for America founder Wendy Kopp.**


**Hon. James Hunt, former Governor of North Carolina.**

Underscoring the importance of innovative efforts to recruit, support and retain teachers, Randi Weingarten, president of the American Federation of Teachers and the United Federation of Teachers, said that monetary incentives alone do not work. Schools must offer "professional development and collaboration" and embed experiential learning like robotics competitions into the curriculum.

Wendy Kopp, whose organization Teach for America has stepped up efforts to bring additional math and science teachers to low-income communities, advocates even more ambitious efforts to tap into a pool of high quality teachers via alternative routes to certification in an all-out "war for talent."

All the participants cited the need to act, and act quickly. As Secretary Duncan remarked, "money isn't everything. But it makes a difference. We've got $100 billion to work with, an unprecedented amount. And we'll never have a better chance to get it done."

Transforming education may be costly, admitted Vartan Gregorian, president of Carnegie Corporation, but falling further behind in math and science carries an even bigger price tag. "If you think it's too expensive, try ignorance," Gregorian said.

Bruce Alberts, professor of biochemistry and biophysics at the University of California, San Francisco, editor-in-chief of *Science* magazine and a former Carnegie Corporation Board member, discusses science education and The Opportunity Equation beginning on the following page. ■

by Bruce Alberts

# *Restoring* SCIENCE *to* SCIENCE *Education*

*What is taught in schools today is a caricature of science. Young people need to be introduced to science's full riches.*

I am fascinated by biology, and nothing in my four decades as a professional biological scientist has given as much satisfaction as seeing that spark of passion for the subject ignited in a young person. So it should be no surprise that nothing frustrates me more than to see that spark extinguished by misguided educators and mind-numbing textbooks. As I write this article, I have just returned from a discussion with 7th-grade students in San Francisco, at which they described their yearlong biology class that they found tedious and anything but inspiring. The course was structured around a textbook that was among those officially selected by the state of California two years ago, after an elaborate and expensive process that California repeats every eight years. The exploration of the wonderful world of living things should be a fascinating delight for students. But in California, as in so many other parts of the United States and the world, most students gain no sense of the excitement and power of science. Instead, we adults have somehow let science education be reduced to the memorization of "science key terms."

How did this happen? And what can we do to recover from this tragic misuse of our young people's time and effort in school?

Part of the answer to the first question lies in the fact that producing and selling textbooks is a big business, and the prevailing market forces have invariably led to mediocrity. Twenty years ago, the situation was elegantly described in a book whose title says it all: *A Conspiracy of Good Intentions: America's Textbook Fiasco*. Sadly, the situation has not changed. Much of the problem lies in the simplistic ways in which these books are usually evaluated, stressing the coverage of science terms and computerized text analyses.

Moreover, in response to the education standards movement of the 1990s, the 50 states set about establishing their own very different sets of detailed science education standards. Because of this heterogeneity, textbook companies are forced to waste great amounts of time and resources on producing books that can satisfy the needs of as many states as possible. Even before the standards movement made things worse, U.S. textbooks had become known around the world for being "an inch deep and a mile wide." The result today is what I call science education as mentioning.

Take for example my field of cell biology, where for grades 5 to 8, the National Science Education Standards produced by the National Academies in 1996 emphasized understanding the essence of cells as the fundamental units of life, rather than learning the technical names of cell parts. The California state standards, on the other hand, stress all of these names. As a result, the adopted textbook for 7th grade contains five pages with 12 cell parts highlighted as key terms: including endoplasmic reticulum, Golgi body, lysosomes, mitochondria, and ribosomes. Because this 700-page book is forced by the California state standards to cover much of biology in similar detail, there is not enough room to explain most of these cell parts. Thus, for example, for the highlighted word "endoplasmic reticulum," the book simply states that "The endoplasmic reticulum's passageways help form proteins and other materials. They also carry material throughout the cell." Why should memorizing these two sentences be of any interest or importance to a 12-year-old? And what if anything will even the best students remember a year later?

Another part of the answer to why the United States has let science education go badly astray is that it is much easier to test for science words than it is to test for science understanding. The new age of accountability in U.S. education has led to a massive increase in testing, and the individual states have generally selected simple, low-cost, multiple-choice tests that can be rapidly scored. Because these high-stakes tests drive teachers to teach to them, they are thereby defining what science education means in our schools. This is a great tragedy, inasmuch as this type of teaching trivializes education for young people. For far too many of them, education appears to be a largely senseless initiation ritual that is imposed on them by adults.

Consider, for example, the following question that is offered in California as a sample item for its 5th-grade science test:

*A scientist needs to take a picture of the well-ordered arrangements of the atoms and molecules within a substance. Which of the following instruments would be best for the scientist to use?*

A) laser light with holograph; B) A seismograph; C) An electron microscope; D) A stereoscope

There are two major problems with this question. The first is that there is no right answer; an electron microscope does not generally have the resolution to decipher the relative arrangement of atoms. But much more important to me is the fact that learning the names of the different machines that scientists use is neither interesting nor relevant to the education of 10-year-olds.

The following anecdote illustrates how far we have strayed from what should be the central purpose of education: empowering students to learn how to learn on their own. A scientist parent notices that her elementary school child has thus far not been exposed to any science in school. As a volunteer teacher, she begins a science lesson by giving the children samples of three different types of soil. Each child is told to use a magnifying glass to examine the soils and write down what they observe in each sample. She waits patiently, but the children are unwilling to write anything. Her probing reveals that after three years of schooling, the students are afraid to express their views because they don't know "the right answer."

Life is nothing like a quiz show. If we adults allow students to believe that we think being educated means knowing all of the right answers, is it any wonder that nearly half of U.S. middle- and high-school students are found to be disengaged from their schooling?

## The four strands of science learning

Ten years after producing the National Science Education Standards, the National Academies convened a distinguished committee of scientists and science education experts to take a fresh look at science education, considering all that had been learned in the interim. In 2007, this group produced the valuable report *Taking Science to School: Learning and Teaching Science in Grades K-8*. This analysis proposes that students who are proficient in science be expected to:

- know, use, and interpret scientific explanations of the natural world;
- generate and evaluate scientific evidence and explanations;
- understand the nature and development of scientific knowledge; and
- participate productively in scientific practices and discourse.

These four strands of science education were judged in the report to be of equal importance. Yet what is taught in most schools today, from kindergarten through introductory college classes, focuses almost exclusively on only a portion of the first of the four strands: teaching students to know scientific explanations of the natural world. Adopting the agenda in Taking Science to School will therefore require an ambitious effort to redefine the term "science education."

The ultimate source of the problem is college. For the most part, those of us who are scientists have made a mess of science education. Scientists are deeply engaged in attempting to unscramble the puzzle of how the world works, and we are thrilled to read about each year's startling advances that increase our understanding of the universe that surrounds us. It seems that each new finding raises new questions to be answered, providing an endless frontier for the next generation of scientists to explore. We believe passionately in the power of science to create a better world. We also believe in the critical importance for everyone of the values and attitudes that science demands of scientists: honesty, a reliance on evidence and logic to make judgments, a willingness to explore new ideas, and a skeptical attitude toward simple answers to complex problems. But very little of this is conveyed to students in our teaching.

It is college science, both because of its prestige and because it is the last science course that most adults will take, that defines science education for future teachers and parents. And yet, when my science colleagues in academia teach a first-year course to college students, most will at best attempt to cover only the first of the four strands of science proficiency recommended in the National Academies report. Any redefinition of science education at lower levels will therefore require a major change in the basic college courses in biology, chemistry, physics, and earth sciences. Each must add an emphasis on the other three strands: a focus on enabling college students to generate and evaluate scientific evidence and explanations; to understand the nature and development of scientific knowledge; and to participate productively in scientific practices and discourse.

## A four-part recipe for action

As in science, strategy is everything when attempting to tackle a difficult problem. And redefining science education along the lines recommended in the Academies' Taking Science to School report will certainly be difficult. To be effective, we need focus, and I therefore propose the following four-part strategy. Much of what I say here about how to move forward is reflected in the new Opportunity Equation report from the Carnegie Institute for Advanced Study Commission on Mathematics and Science Education, in which I participated.

**1.** *Enlist the National Academies, in collaboration with the National Science Teachers Association and the American Association for the Advancement of Science, to develop a pared-down set of common core standards for science education that reflect the principles in Taking Science to School.*

**2.** *Initiate a high-profile effort to produce quality assessments, connected to these standards, that measure student learning of all four strands of science proficiency.*

**3.** *Link the core science standards and their associated assessments to an intensive research program in selected school districts, so as to provide the "ground truth" needed for their continuous improvement.*

**4.** *Work to strengthen the human resources systems of states and school districts so as to recruit, retain, and deploy a corps of highly qualified science and math teachers.*

The major goal for science education must be to provide students with the skills of problem solving, communication, and general thinking required to be effective workers and educated citizens in the 21st century. These skills are crucial to enable everyone to navigate the increasingly complex and noisy world that we live in. Thus, they are essential to empower the citizens in a democracy to make wise judgments for themselves and their communities, in the midst of the cacophony of voices striving to sway rather than enlighten them. ■

Excerpted with permission from ISSUES IN SCIENCE AND TECHNOLOGY, Alberts, "Restoring Science to Science Education," Summer 2009, p. 77-80, Summer 2009 by the University of Texas at Dallas, Richardson, TX.

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# Literacy Plus Math and Science: *An Equation for American Progress*

*Vartan Gregorian—continued from inside front cover*

quality education at every level, America will lose its greatest asset: a knowledgeable and engaged citizenry.

The Corporation's most recent efforts are embodied in two reports. *The Opportunity Equation: Transforming Mathematics and Science Education for Citizenship and the Global Economy*, was produced by the aforementioned Carnegie Corporation-IAS Commission on Mathematics and Science Education. It is the focal point of a mobilization effort aimed at transforming education in the United States so that every student reaches higher levels of mathematics and science learning. The nation's capacity to innovate for economic growth and the ability of American workers to thrive in the global economy depend on a broad foundation in math and science, as do our hopes for preserving a vibrant democracy and the promise of social mobility for young people that lie at the heart of the American dream. Indeed, mathematics is a critical gateway subject and core competency for college preparation and technical careers at all levels. The sciences provide both a method of approach to problem solving and the basic knowledge needed in our complex society for carrying out civic responsibilities such as serving on a jury (which might, for example, involve understanding the relevance of DNA test outcomes) or voting on social issues such as stem cell research. That is why President Barack Obama, like some of his predecessors, has made education a top priority for our nation, calling for "a renewed commitment to education in mathematics and science." Pointing out that "the progress and prosperity of future generations will depend on what we do now to educate the next generation," the president concluded that "we can't start soon enough" to deeply re-engage our educational system and our citizenry with reformation of math and science teaching and learning.

A high level of literacy based on being able to understand the knowledge and information conveyed through written text is the foundational skill for the competencies noted above. This concern is at the heart of *Time to Act: An Agenda for Advancing Adolescent Literacy for College and Career Success*, the capstone report of Carnegie Corporation's Council on Advancing Adolescent Literacy which, for six years, explored issues of adolescent literacy and the research, policy and practice related to the reading and writing competencies of middle and high school students. In particular, the Council focused on a challenging "disconnect" in our educational system, namely, that while what is expected in academic achievement for middle and high school students has significantly increased, the way in which students are taught to read, comprehend and write about subject matter has not kept pace with the demands of schooling. Students who are not proficient at understanding what they read and in communicating what they have learned are also at a tremendous disadvantage when it comes to succeeding in college and in competing for success in a world where business and markets have no borders and the flow of information seems to have turned into an endless, almost overwhelming torrent from which real knowledge can only be extracted by those with disciplined minds and analytic skills.

Given these facts, to be content with the status quo in terms of American literacy is tantamount to giving up on our nation and that is something we will never do. But it is especially ironic to be facing these problems in a country where education is considered to be a right accorded to every citizen. However, having rights and being provided with equal and open access to education means nothing unless these rights can also help to actualize the potential of individuals from every segment of American society, from every town, every city, every region. Over 150 years ago, Edward Everett—minister, scholar, orator, politician, and president of Harvard—said that there were two roads a society might travel when it came to the question of education. One was "to treat education as a luxury for a small privileged class of wealth and leisure." But as Everett noted, that was not the American way. The character of our nation was—and is—deeply rooted in the notion of making "the care of the mind part of the public economy [and] the growth of knowledge a portion of the public wealth."

Today, as we head toward the second decade of the 21st century, the time has certainly come to set ourselves the task of helping all American students become wealthy in knowledge and understanding by improving their literacy skills and hence, their ability to achieve excellence in whatever fields of study they will need to pursue in order to achieve a successful future for themselves and our nation. As Andrew Carnegie said, one of the jobs of a patriot is "The dispelling of ignorance and the fostering of education." As patriots, and as parents, teachers, leaders of business and government—and as Americans—let us therefore commit ourselves to being good ancestors to the generations who follow after us by ensuring that each and every one of them can "read to learn." ■

VARTAN GREGORIAN, *President*

# Recent**Events**

GETTY

**Senator John Kerry**

## Policymakers Address U.S.-Russia Partnership

Last spring, Carnegie Corporation hosted a conference in cooperation with the Carnegie Endowment for International Peace, the American Academy of Arts and Sciences, the Aspen Institute, the Brookings Institution, the Council on Foreign Relations, the Woodrow Wilson International Center for Scholars and the Library of Congress. The meeting was held at the Library, and brought together top policymakers, scholars and others to discuss and analyze the current and future state of U.S.-Russia relations.

Panelists included former Senator Sam Nunn, co-chair of the Nuclear Threat Initiative; former Ambassador Thomas Pickering and Brookings president and former Deputy Secretary of State, Strobe Talbot. Topics ranged from the impact of the shifting global power structure to the possibility of engaging Russia as a partner in U.S. dealings with Afghanistan and Iran. In addressing the critical problem of nuclear nonproliferation, featured speaker Senator John Kerry, Chairman of the Senate Foreign Relations Committee, proposed that the U.S. "set a near-term goal of no more than 1,000 operationally deployed warheads," noting that, "experts affirm this can increase our national security, rather than diminish it."

## Service Opportunities in New York City

New York City Mayor Michael R. Bloomberg launched NYC Service, a new initiative designed to promote an era of volunteerism in the city, on April 20, 2009. Supported in part by Carnegie Corporation, the initiative is intended to meet President Obama's nationwide call to service. Over 1,000 attendees representing a diverse cross-section of New York City organizations took part in the kickoff event. The Mayor was joined by Caroline Kennedy, whose uncle, U.S. Senator Edward M. Kennedy, was the chief sponsor of the Serve America Act, and U.S. Representative Carolyn McCarthy, who was the main sponsor of the House version of the bill.

The President signed this historic legislation—which increases the size of the AmeriCorps service program over the next eight years, expands ways for students to earn money for college, and creates opportunities for all Americans to serve in their communities—at a ceremony in Washington, DC, the following day. The NYC Service program builds on the national momentum. "Throughout my life, I've found that giving back is one of life's greatest rewards and that civic service may be the most important thing we ever do," Mayor Bloomberg said.

ASSOCIATED PRESS

**Caroline Kennedy and Mayor Michael Bloomberg with volunteers**

POLICY ARCHIVE

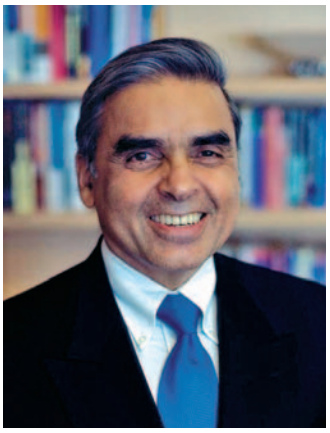
## Putting Policy Research Online

Philanthropy New York (formerly the New York Regional Association of Grantmakers) joined with Geri Mannion, the Corporation's Program Director, U.S. Democracy and Special Opportunities Fund, to host a briefing on the Center for Governmental Studies' Policy Archive project. This free online repository of public policy research is the largest in the United States and houses and disseminates information from major think tank, university, government, private and foundation-funded sources with diverse perspectives. It currently contains more than 23,000 documents from 600 contributing organizations and individuals, and is constantly growing. While billions of dollars are spent on research every year, the resulting documents are often difficult to find using popular search engines. The Policy Archive aims to solve this problem by providing quick access to its permanently archived material.

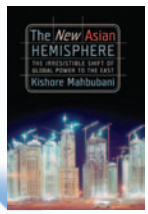
## Anticipating the Rise of Asia

A luncheon to celebrate the publication of author Kishore Mahbubani's latest book, *The New Asian Hemisphere: The Irresistible Shift of Power to the East*, was hosted by the Corporation on June 8, 2009. Mahbubani, a former diplomat, is now dean and professor in the Practice of Public Policy at the Lee Kuan Yew School of Public Policy at the National University of Singapore. In this, his third book, he predicts that by 2050, three of the world's largest economies will be Asian: China, India and Japan.

**Joel Stonington, Graduate School of Journalism, Columbia University; Linsay Rousseau Burnett, University of California Berkeley School of Journalism; Rhonda Schwartz, Chief Investigative Producer, ABC News, Brian Ross' Unit; Angela Flores, John F. Kennedy School of Government, Harvard University; Kieran Meadows, CUNY Graduate School of Journalism**



**Kishore Mahbubani**




He advises the West to gracefully share power with Asia by giving up domination of global institutions and suggests that new Asian powers would reciprocate by becoming responsible stakeholders in a stable world order. "The rise of the West transformed the world," Mahbubani writes in the introduction. "The rise of Asia will bring about an equally significant transformation. This book describes why Asia is rising now, how it will alter the world, and why the West, even though it should celebrate Asia's rise, will have great difficulty adjusting to these changes." Attendees at the event included distinguished authors Calvin Trillin and Lewis Lapham as well as veteran CBS reporter Morley Safer, among others.

## Reframing Education Coverage

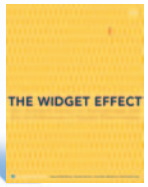
On June 15, 2009, a summit on education and urban school reform, supported by the Corporation's Dissemination Program, was hosted at the Harvard Club. Announcing that, "Half of our nation's youth in the inner cities are dropping out," this event aimed to bring together an important group of business leaders, education experts, leading education journalists and media decision-makers to discuss the framing of the educational crisis and to determine effective ways to report on it. The group debated whether urban education could be cast as an economic issue to give it more urgency and prominence, and discussed ways to reframe the problem as not only a serious domestic and racial issue, but also as a drag on the nation's global competitiveness. Joel Klein, Chancellor of the New York City Department of Education, delivered the keynote address, which emphasized the critical need for reform, and outlined some of the approaches that have met with success in the New York City school system.

## 2009 Carnegie Fellows at ABC News

Students from four top journalism schools were hand-picked for an assignment at ABC News in New York City during the summer of 2009. Working in the network's investigative unit led by Brian Ross, these Carnegie Fellows traveled to several states investigating the issue of child labor in the migrant workforce. The 10-week Carnegie Fellow program, now in its fifth year, offers students from across the country paid internships and hands-on reporting experience in one of America's most respected news organizations. Kerry Smith, senior vice president for editorial quality at ABC, oversees the program.

## Tracking Teacher Effectiveness

The New Teacher Project

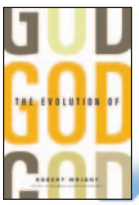



Effective teachers are the key to student success, yet they are too often regarded as interchangeable parts—like widgets—not as professionals. This problem is addressed in an eye-opening report, *The Widget Effect*, introduced at an event hosted by program officer Talia Milgrom-Elcot at Carnegie Corporation on July 8, 2009. The report, produced by The New Teacher Project, a nonprofit founded by teachers in 1997 to address the growing issues of teacher shortages and teacher quality throughout the country, focuses on the failure of evaluation systems to provide accurate and credible information about individual teachers' instructional performance. It describes the tendency of school districts to assume classroom effectiveness is the same from teacher to teacher, denying their individual strengths and weaknesses and, it contends, gambling with the lives of students.

Reversing this effect calls for four steps: adopting a comprehensive performance evaluation system; training evaluators in the system and holding them accountable; integrating the system into policies for compensation, retention and dismissal and adopting dismissal policies that make it easier for low performers to exit the system. Following the presentation of the report (which was co-sponsored by the Robertson Foundation) a panel discussion on the recommendations, which included Rob Weil of the AFT and Joanne Weiss, the head of the Race to the Top fund for the US ED, was moderated by Michele Cahill, Carnegie Corporation vice-president, National Programs and program director, Urban Education.

bloggingheads.tv

**Robert Wright**




## A Visit from the Blogosphere

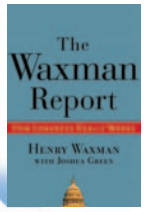
On July 23, 2009, noted author Robert Wright, co-creator of the web site Bloggingheads.TV (which is supported by Carnegie Corporation's International Program) visited the Corporation to discuss his media project and his latest book, *The Evolution of God*.

*(Continued on page 44)*

**Stephen Del Rosso introducing the author**

The book, which Wright describes as a history of "God's moodiness," takes readers from polytheism through the Abrahamic faiths, and aims to bring out the best in religion in the contemporary world by looking through the lens of the ancient world, the author says. Since 2005, the Bloggingheads.TV web site has offered a series informal debates between two high-profile scholars with differing views on politics, religion, science or popular culture. Wright discussed the importance of the diversity of views represented on the site, which is known as a place where great minds don't think alike, and where "thoughtful disagreement is (almost always) expressed in civil terms." Excerpts from these conversations are regularly featured in *The New York Times*, Atlantic, Huffington Post and other media outlets and on popular blogs.

## Behind the Scenes with the Congressman




"It's important for people to know that government does work," says Henry Waxman, who has spent 35 years representing the people of California, making him an ideal guide to the subtleties and complexities of the legislative process. "Laws most people now take for granted, like the Clean Air Act, were once very controversial and took a long time to pass. But we did it," he adds, bringing about reductions in urban smog, toxic air pollution, acid rain, and damage to the stratospheric ozone layer. Waxman is known for taking a stand on other crucial issues such as food safety and the quality of medical care, as well as acting as a watchdog everywhere from Wall Street Banks to Major League Baseball.

On August 3, 2009, Carnegie Corporation president Vartan Gregorian held a reception in honor of Chairman Waxman, celebrating the publication of his book, *The Waxman Report: How Congress Really Works* (Hachette) written with Joshua Green. The book offers a rare look behind the scenes in Washington, D.C., revealing the strategy, maneuvering and backroom deals that get things done. His stories are surprising because they illustrate how the most dramatic breakthroughs may occur through small twists of fate or the most narrow voting margin.

**Thomas H. Kean, Henry Waxman and Vartan Gregorian**

**David A. Hamburg and Mark Green**

## Books from the Bibliotheca Alexandrina

In an agreement signed in August 2009, Carnegie Corporation of New York awarded a $1 million grant to Egypt's New Library of Alexandria (Bibliotheca Alexandrina) to support the reissuing of modernist publications from Muslim societies. Under the leadership of Ismail Serageldin, the Library recently launched a project that aims to produce modern editions of about one hundred significant works written between the 18th and the mid-20th century, prefaced by contemporary scholars and translated into one or more languages. The topics include religion and nationalism, secularism and tradition, education and science, the legitimacy of political systems, philosophy, law and constitutionalism. The writings influenced significant social movements, such as the reform of educational and legal systems and changes in the status of women. The goal is to broaden the public's understanding of the diverse histories of Muslim societies and thought for both Muslims and non-Muslims alike.

VIRGINIA MALLON

**Vartan Gregorian and Dr. Ismail Serageldin**


RALPH ALSWANG

**Program Officer Andrés Henríquez at the Time to Act launch.**

BOB WINKLER

**Reverend Stephen John Thurston, President, National Baptist Convention of America, Inc.; Reverend Richard Ryscavage, S.J., Director, Center for Faith and Public Life, Fairfield University; Rabbi Morris Allen, Project Director, Beth Jacob Congregation; Reverend Dr. David Benke, D.Min, President Lutheran Church-Missouri Synod, Atlantic District; Reverend Patricia Van Pelt-Watkins, Executive Director, TARGET Area DevCorp; Most Reverend Thomas Wenski, Bishop, Catholic Diocese of Orlando; Reverend Jeffrey P. von Arx, S.J., President, Fairfield University; Rami Nashashibi, Executive Director, Inner-city Muslim Action Network**

## Advancing Adolescent Literacy

In September 2009 education reformers, funders, policymakers and others gathered in Washington, DC for the release of *A Time To Act: An Agenda for Advancing Adolescent Literacy for College and Career Success*, the capstone report of the Carnegie Council on Advancing Adolescent Literacy. The report is the culmination of best practices; up-to-date research; and the most thoroughly compiled and analyzed data available on how to help adolescent students "read to learn." While there is a strong knowledge base of reading instruction for grades K-3, literacy supports for adolescents are far fewer due in part to greater instructional challenges and the range of complex strategies required. "The Council has focused on a challenging 'disconnect' in our education system, namely, that while what is expected in academic achievement for middle and high school students has significantly increased, the way in which students are taught to read, comprehend and write about subject matter has not kept pace with the demands of schooling," said Vartan Gregorian, president of Carnegie Corporation. *Time To Act*, and five accompanying online reports, acknowledges that students' reading skills, when they enter high school, significantly impact their ability to -navigate complexities of high schools level text and can anticipate their likely level of college and career preparedness. The Council's report advocates for literacy advancement to be the job of the whole school with efforts cutting across all content areas, and it sets out a national agenda for fully supporting young learners.

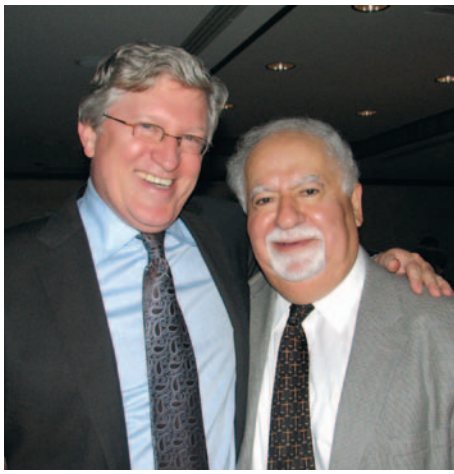
The reports can be downloaded at www.Carnegie.org/literacy/tta.

## Continuing the Immigration Conversation

In June 2009, Fairfield University's Center for Faith and Public Life partnered with Carnegie Corporation to convene religious leaders around the question of immigration. The university's initiative, "Strangers as Neighbors: Religious Language and the Response to Immigrants in the U.S.," aims to increase understanding of ways the religious point of view can influence political discourse and change the highly partisan debate on this issue. Jewish, Islamic, and Christian leaders, as well as scholars and public policy representatives attended the event. In line with Carnegie Corporation's goals, the project envisions a more welcoming society that better manages the integration of immigrants into civil society by changing the language of the debate.

## Celebrating the Gates Foundation CEO's First Year

Jeff Raikes has been CEO of The Bill & Melinda Gates Foundation since September 2008, and Carnegie Corporation president Vartan Gregorian marked his first anniversary with a New York reception for education and philanthropy leaders and other well-wishers. Gregorian praised Raikes for his longstanding commitment to philanthropy, saying he had proven his willingness to not only "talk the talk, but walk the walk," by founding his own family foundation and by generously supporting the University of Nebraska in his home state. Raikes, who has spent the past year traveling the world on a first-hand investigation of the Gates Foundation's many projects, spoke enthusiastically about this "once-in-a-lifetime opportunity to transform people's lives on a global scale." It's been an extraordinary education, he said, and Melinda Gates' deep understanding of how the foundation works makes her an outstanding teacher.



VIRGINIA MALLON

**Jeff Raikes and Vartan Gregorian**

# Foundation**Round up**


### MFX Solutions- Reducing Currency Risk in Microfinance

For the first time, microfinance lenders in developing markets will have access to modern hedging instruments to help stabilize and reduce currency risk in underserved markets. MFX Solutions Inc., the product of a three year collaboration involving a group of U.S. and European microfinance funds, networks and foundations, has pooled resources to make modern currency risk management tools available to the industry in the developing world.

MFX's mission is to help microfinance institutions and investors analyze, quantify and reduce currency risk, which is often a key impediment to the growth of underserved markets. It addresses the risks faced by microfinance institutions when they borrow dollars or euros and lend in local currency. The company offers hedging products that allow lenders to offset currency risk and lend safely in high risk markets such as sub-Saharan Africa. It also provides free online analytic tools to help MFIs develop safe and sustainable funding strategies in volatile markets.

By offsetting of lenders' risks and lowering the costs, MFX can help unlock hundreds of millions of dollars in local currency loans to underserved markets. "Getting microfinance to scale isn't just about efficiency, it's about reducing vulnerability at the base of the pyramid," said Monica Brand, Director of ACCION International's Frontier Investments, an investor in the initiative. MFX funders include 17 MF organizations, as well as USAID and the US Government's Overseas Private Investment Corporation (OPIC).

To find out more about MFX Solutions, please visit: www.mfxsolutions.com


### Innovative tool helps grantmakers see impact

The Foundation Center has launched Philanthropy *In/Sight*™. This new interactive mapping tool enables users to visualize the spending patterns of private foundations and public charities through a familiar Google map interface. *In/Sight* is a Geographic Information System (GIS) that displays various data sets in quickly grasped visual formats and provides ease of navigation through drill-down and cross-linking technology.

Users can create customized Google maps to explore not only giving patterns but emerging trends and funding relationships globally, nationally or at the community level. The maps are updated weekly via the Center's data on over 97,000 grantmakers and 1.6 million grants. Information is combined with dozens of demographic and socio-economic overlays, which vividly depict foundation dollars and their effects.

As a result, people can begin to see not only patterns of giving, but where funding is lacking, bringing a whole new level of transparency to the $46 billion philanthropic industry.

The demographic and thematic data for *In/Sight* is drawn from numerous sources such as the American Human Development Project of the Social Science Research Council and the U.S. Census Bureau's American Community Survey.

While the tool is available only by subscription, it will enable funders a choice of filters and more granular criteria, displaying giving geographically by country, state, county, city, metro area, and congressional district.

With support from the John D. and Catherine T. MacArthur Foundation and the Ford Foundation for ongoing development and improvement, the Center also plans to offer *In/Sight* to regional associations of grantmakers and funder affinity groups worldwide, free of charge for one year, through their organizations' membership sites. Organizations can request a free trial of *Philanthropy In/Sight* by calling (800) 424-9836 or sending an e-mail to insight@foundationcenter.org

To find out more about *In/Sight*, please go to http://philanthropyinsight.org/About.aspx.

SUNDANCE
INSTITUTE

### Sundance Film Festival Gets Funding from OSI

Sundance Institute will receive a $5 million grant for its Documentary Film Program from the Open Society Institute (OSI) to help raise awareness on human rights. The Institute works to support the dissemination of filmmakers' work on some of the most challenging issues of our times. Support for the Sundance Documentary Film Program renews OSI's commitment to the endeavor that began in 1996.

OSI has a history of supporting documentary storytellers and is part of a dollar-for-dollar matching grant program that the Sundance Institute hopes will raise $10 million over the next five years. Since its inception, the Sundance Institute Documentary Fund has awarded grants to more than 450 films in 54 countries, from the former Soviet Union, the Middle East, China, India, Africa, North America and elsewhere.

"This critical funding at a very fragile time is a significant commitment to supporting the belief that documentary storytelling has a meaningful role in the international work toward justice and equity across a range of issues," said Cara Mertes, director of the Sundance Institute Documentary Film Program.

For more information on The Open Society please go to www.osi.org

Or for the Sundance Film Institute go to: http://www.sundance.org

USC ANNENBERG
SCHOOL FOR COMMUNICATION

### Philanthropic Foundations: Growing Funders of the News

The current crisis in journalism is eliciting new support from leaders in the foundation, education and nonprofit worlds. Acting as a "firewall against the disappearance of critical news and information," these unusual bedfellows convened a meeting with journalists in 2008 to discuss the current state of the industry.

Stemming from that meeting, a new report out of the Center on Communication Leadership and Policy (CCLP) at the University of Southern California's Annenberg School for Communication, highlights the work of foundations in supporting journalism. *Philanthropic Foundations: Growing Funders of the News* was authored by David Westphal, former Washington editor for McClatchy Newspapers and now a senior fellow at CCLP, who conducted extensive interviews with leaders in the philanthropy, journalism, education and nonprofit fields. The report reveals

a grave need for intervention to transform the traditional economic model of journalism. Nonprofit partnerships are a new idea that many in the industry and foundation world look toward with enthusiasm.

"I think it's safe to say there's a growing understanding you can't run a democracy without a free flow of information," said Alberto Ibargüen, CEO of the John S. and James L. Knight Foundation. "Communities will soon become aware that a core need is communication."

Foundations have already become increasingly involved in the journalism industry, supporting topical journalism projects and community news Web sites. Westphal presented his research, along with initial findings from a new Carnegie Corporation sponsored project on the role of government in supporting news and information, at the annual convention of the Association of Education in Journalism and Mass Communications in August.

For a free copy of the report please visit the Annenberg Center on Communication Leadership and Policy: http://communicationleadershipblog.uscannenberg.org/2009/07/cclp-report-details-growing-ph.html

### Soros Helps Those Hurt by Financial Turmoil

Hoping to inspire other foundations to continue their optimum level of giving, George Soros and the Open Society Institute pledged $50 million to help New Yorkers in need. The matching grant, pledged to the Robin Hood Foundation, will go toward services such as food and shelter. It is deemed one of the largest gifts made to satisfy basic needs.

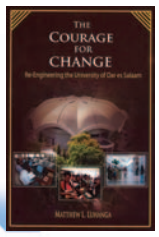
The financial meltdown has been particularly bad for New York, with the city seeing record-level family homelessness over the past few months. The grant will help to fill the gap left by foundations and charities that were also hit by the financial downturn. "Just as needs have increased so tremendously, the philanthropic organizations have also been victims of this crisis and they have had to cut back. We want to reverse this," said OSI founder George Soros.

In addition to providing support for needy New Yorkers, Soros and OSI recently announced a one-time gift of $100 million to help communities in Eastern Europe and the former Soviet Union, regions deeply affected by the global downturn. The funds will be used over the next two years in the Balkans, the Baltic states, Central Asia, the Caucasus and Ukraine. A committee made up of locals and foundation staff will evaluate the severity of the crisis in each country to determine need and assess each proposal.

For more information on the Open Society Institute, please go to: www.soros.org

## Recent**Books:** *Supported by Carnegie Corporation*

### The Courage for Change
**Re-Engineering the University of Dar es Salaam**




BY MATTHEW L. LUHANGA
*Dar es Salaam University Press*

"It is not the strongest of the species that survive, nor the most intelligent, but the ones most responsive to change," begins Matthew Luhanga, quoting Charles Darwin and setting the tone for an account of his extraordinary career. The youngest, longest serving Vice Chancellor (VC) of the University of Dar es Salaam (UDSM), Luhanga was appointed to this top position just three months after becoming Chief Academic Officer – the only administrative position he had ever held.

Luhanga, a professor of telecommunications engineering, was focused on research and developing the university's first Master's program in the field. But after intervening in a student protest on behalf of his boss, the Vice Chancellor, Luhanga found that the president of the United Republic of Tanzania had fired that VC – and appointed him! "It took eight years for the Central Establishments to write me an official letter of appointment," he recalls. "It contained no terms and conditions of service and none were ever issued to me for the 15 years and 8 months I served as Vice Chancellor." Despite this troubled beginning, it was during his tenure that a dramatic transformation of UDSM took place.

While coping with violent student protests, severe economic hardships and conflicts between the university and the government, Luhanga and other university leaders devised a strategy for building human capital, raising academic standards, increasing enrollment, rehabilitating and expanding infrastructure and technology and improving gender balance. Here he tells how, with determination as well as support from Carnegie Corporation and other funders, the university was reengineered for the improvement of the lives of Tanzanians, Africans and others around the world.

### Better Safe than Sorry
**The Ironies of Living with the Bomb**


BY MICHAEL KREPON
*Stanford Security Studies*

"Pessimism serves no useful purpose in dealing with the dangers of nuclear proliferation and terrorism," says author Michael Krepon, founder of the Henry L. Stimson Center and Diplomat Scholar at the University of Virginia. While admitting our worst fears still could be realized at any time, he argues that the United States today possesses more tools and capacity to reduce nuclear dangers than ever before. In this book, written with Carnegie Corporation support, Krepon provides a snapshot of where we are now and moves back to earlier periods of presumed maximum nuclear danger, to provide context for the future he envisions. With all but eight countries having pledged not to acquire the Bomb, and major powers having less use for it than ever, he believes if the U.S. adopts a "back to basics" approach—from containment and deterrence to diplomacy, military strength and arms control—cooperative threat reduction initiatives can provide safe passage through this, the second nuclear age.

# THE BackPage

*Pablo Eisenberg is currently a Senior Fellow at the Georgetown Public Policy Institute. Prior to his coming to Georgetown in January, 1999, he served for 23 years as Executive Director of the Center for Community Change, a national technical assistance and advocacy organization working with low income and minority organizations and constituencies throughout the country. In addition, he has published many articles and chapters of books and has been a regular columnist for* The Chronicle of Philanthropy *for the past seventeen years. His book,* Challenges for Nonprofits and Philanthropy: The Courage to Change*, was published by the New England Press and Tufts University in December of 2004.*

*by* PABLO EISENBERG

# *Why* Nonprofits *Need* Newspapers

**Editor's Note:** *Pablo Eisenberg is a long-time observer and critic of the nonprofit sector. Carnegie Corporation offered him this space to explore his major concern about how the continuing decline in the number of newspapers being published—and hence, the dearth of investigative journalism focused on all areas of society, including nonprofits—has impacted accountability in the independent sector. And as they say, these are Mr. Eisenberg's views, not necessarily those of the Corporation.*

The potential demise of daily newspapers and investigative journalism is arguably the biggest threat to the future of our nonprofit sector.

For the past twenty years, the media, notably print journalism, has assumed responsibility for keeping our nonprofit organizations publicly accountable and somewhat in balance, tempering their problems and excesses through the power and threat of information and exposure.

No other institution has had a similar impact. The Internal Revenue Service, which is supposed to oversee and police the nonprofit sector, has had neither the resources nor the will to do the job effectively. State attorneys general charged with a similar responsibility at the state level do not have the money or staff to provide adequate oversight. And self-reform, the cure-all championed by a self-indulgent nonprofit community, has been a miserable failure, if only because its advocates have never been willing to implement any serious self-reform measures.

What has been particularly impressive about the newspapers' coverage of the nonprofit field has been their influence on policymakers. Past scrutiny has led to investigative hearings and action by the Senate Finance Committee; changes in state regulatory measures; a more critical examination of nonprofit hospitals, big art donors' tax benefits and the practices of public university and college foundations; increased scrutiny by state regulators; and pressure on the IRS to improve its audit and enforcement procedures.

Nor should one downplay the deterrence factor of media attention. Nonprofits have been increasingly sensitive to the watchful eyes of newspapers analyzing their budgets, compensation policies, potential conflicts of interest and governance practices. While difficult to measure, these watchdog efforts have made a real difference in preventing undesirable practices and causing institutional changes in behavior.

We should not forget that only a few years ago both the foundation and nonprofit worlds were racked with scandals. The investigative stories of major newspapers such as the *Boston Globe*, the *Washington Post*, the *San Jose Mercury News* and the *Los Angeles Times* uncovered malpractices at hundreds of foundations and nonprofit groups, ranging from inappropriate expenditures, self-dealing, conflicts of interest, excessive compensation, board ineptitude and the lack of public accountability. Faced with these facts, the Council on Foundations, Independent Sector and other trade associations could no longer offer the lame rationale that there were "only a few rotten apples in the barrel."

While the nonprofit and foundation worlds appear to have improved since then, as evidenced by fewer headline-making corruption cases, it is difficult to attribute this development to any substantial changes in the way in which the sector conducts its operations. Today, unfortunately, nonprofit organizations and foundations are still beset by the same wide range of serious problems and challenges they faced several years ago. Local newspapers continue to report inappropriate and dishonest activities by nonprofits in communities throughout the country. Every month, the *Nonprofit Imperative*, a newsletter devoted to such abuses, lists dozens of nonprofits whose malpractices has been identified by the media. The improprieties and scandals have not changed, and the nonprofits involved continue to undermine public confidence in our charitable organizations.

What has changed is that many daily newspapers have abandoned their investigative teams, cut their reportorial staff and narrowed their focus. They are no longer paying as much attention to the nonprofit world that they covered so conscientiously a few years ago. For the nonprofit community, the pressure for accountability is being relaxed. The heat, in short, has been turned off.

To understand the seriousness of the crisis, one only has to look at the numbers. Daily newspapers declined from 1,600 in 1990 to 1,422 in 2007. Recently, both the *Rocky Mountain News* and the *Seattle Post-Intelligencer* closed their doors, while the *Detroit Free Press*, the *Detroit News* and the *East Valley Tribune* in suburban Phoenix stopped printing several days of the week. The *New Haven Register*, the *Hartford Courant* and the *San Francisco Chronicle* are in deep financial trouble. Both the Chicago Tribune Company, publisher of the *Chicago Tribune*, and the *Minneapolis Star-Tribune* went into bankruptcy early in 2009. Publicly traded newspaper stocks lost 83 percent of their value in 2008.

According to the *State of the News Media, 2009*, published by the Pew Project for Excellence in Journalism, approximately 8,300 professional newsroom staff lost their jobs during 2007 and 2008. Daily newspapers have lost 17 percent of their newsroom staff since 2001. Many newspapers have either eliminated or drastically reduced their overseas bureaus. To make matters worse, the layoffs and buyouts of newsroom staff have stripped the dailies of many of their most capable reporters and editors. These reductions are serving as a disincentive to investigative jour-

nalism. Under pressure to cover a lot of news with fewer people, newspapers are not giving their reporters the time and resources for sustained investigative work.

The decline in daily newspapers and the reduction in newsroom staff, especially investigative reporters, is a worrisome development. As Charles Lewis, founder of the Center for Public Integrity, a Washington-based center for investigative journalism, notes, "Never in our lifetime has there arguably been a greater public need for independent, high-quality journalism in the United States." Not only will this turn of events have potentially disastrous consequences for the accountability of the nonprofit sector, but it will reduce the quality of public information so essential to an informed citizenry...the heart of a vibrant democracy. The Project for Excellence in Journalism recently stated the problem succinctly: "The press is no longer gatekeeper over what the public knows."

It is not likely that we will see a resurgence of the old quality journalism. Declining circulation, reduced advertising revenue, an increase in online journalism and the demands of Wall Street have put growing pressure on newspapers to cut costs and retrench rather than invest for the future. Though still earning pre-tax profits between 12 and 15 percent* newspapers are finding that this is not adequate to satisfy investors or owners who view journalism simply as a business to make money, not as a means to inform the public and fulfill broad social purposes. The days of the old media visionaries and risk-takers like Adolph Ochs, Joseph Pulitzer and George Barry Bingham are gone.

One might have hoped that the growing number of blogs and centers for investigative journalism could have begun to fill the gap left by the withdrawal of newspapers from covering the nonprofit world. But that has not happened. The profusion of blogs is too diverse and unfocused, lacking any quality control, to provide a reasonable overview of nonprofit activity. And the major centers for investigative journalism like the Center for Public Integrity and Pro Publica pay little attention to the nonprofit world.

The crisis in accountability in recent years has become all the more acute as the number of operating nonprofits has grown enormously and the sector has assumed even greater responsibility for society's well being. Public expectations are greater than ever. Public confidence in their performance and integrity is, of course, the key to nonprofits' ability to raise money. While most nonprofits are honest and transparent, the small number that are not can stain the reputation of the entire field. That is why there must be oversight mechanisms to ensure that both nonprofit organizations and philanthropic foundations operate ethically and effectively. The loss of daily newspapers and the investigative journalism they have traditionally provided will make this task much more difficult.

What can be done to address this dilemma? One answer would be to save daily newspapers by converting them into nonprofit entities. Nonprofit ownership of key papers could infuse journalism with the energy, integrity, quality and stability that it so desperately needs. And it could insure the continuing oversight of nonprofits and foundations.

The *New Hampshire Union Leader*, the Associated Press and the *Delaware State News* have operated as nonprofit enterprises, while the *St. Petersburg Times*, a successful for-profit newspaper, is owned by the nonprofit Poynter Institute which provides the paper with insurance against the harsh pressures of the market. With an infusion of new money, backed by endowment funds, a number of failing daily newspapers could be restored and their former capacity for investigative reporting rebuilt.

Such a task is a great opportunity for very wealthy Americans and our large foundations to have a really huge impact on our society and democracy.

It is surprising that, as yet, neither big individual donors nor major foundations have shown any interest in reviving American newspapers and quality journalism, even as billions of dollars are being poured into arts institutions, universities and health facilities. It's hard to believe that philanthropy could have neglected such an important priority, and one can hope that steps will soon be taken to preserve an independent and vibrant press—the backbone of American democracy.

There is still time to take action before more ailing newspapers fail. A strong *Philadelphia Inquirer*, *Hartford Courant*, or *Atlanta Journal-Constitution*, with ample endowments to withstand the shock of hard financial times, would not only be a boon to our society but might also motivate some newspaper owners to revert to old times when running a newspaper had a social purpose and was more than a business.

Just as our nonprofit community is endangered by the diminishing strength of an outside force like journalism, it is also imperiled by an invidious internal disorder—the crumbling of its intellectual foundation.

Few nonprofit practitioners have devoted much, if any, time to thinking and writing about what they do, what problems the sector faces and what must be done to meet the challenges of the next 25 to 50 years. Introspection and critical analysis are at a premium. Unfortunately, academic scholarship, while sometimes useful, often lacks the practical understanding of the ways in which nonprofits really operate. In short, the nonprofit field is intellectually moribund.

Though many practitioners in both operating nonprofits and foundations lack the confidence to write and publish, the major obstacle they face is simply the lack of access afforded them by the news media, trade associations and the few publications that cover nonprofit organizations. Only a very few outlets are open to them. This needs to change if the sector is to achieve the vision and sense of purpose it so desperately requires.

One small step in this direction would be the creation of an independent magazine that could publish articles by practitioners eager to air their ideas and suggestions. Such a development might encourage nonprofit associations and organizations to establish other vehicles for public discussion and debate. It and other outlets could galvanize the type of thinking and analysis the sector lacks. They could unleash the brainpower lurking in the collective nonprofit mind.

To resuscitate the nation's daily newspapers and to kindle an intellectual bonfire in the nonprofit community would take a great deal of energy and effort. It also would take a lot of money. But there is plenty of money available, if only our very wealthy donors and foundations are willing to put it to good and vital purposes.

For those who owe their wealth to the opportunities afforded them by our open society and democracy, could there be a more important priority than preserving the vibrant press that is an essential element of a democratic society? And for foundations committed to serve the public interest, what better purpose could there be than strengthening our most cherished civic institutions? Unless major donors wake up to the desperate needs of these endangered institutions, we may well see the end of quality journalism and the decline of the nonprofit sector due to lack of accountability. This would be a grim future indeed; a collective failure that no one would want as a legacy for our nation. ■

* *According to "The Newspaper Industry Today," a paper by Mort Goldstrom presented at a March 2009 meeting of newspaper executives and available on the web site of the Newspaper Association of America (http://www.naa.org/Resources/Articles/Advertising-Presentation-Newspaper-Industry-Today/Advertising-Presentation-Newspaper-Industry-Today.aspx), "Many newspapers have dropped from a 30 percent margin to maybe a 10 to 15 percent margin." However, other industry observers such as Brian Tierney, publisher of the* Philadelphia Inquirer*, note that local markets may be faring worse in terms of earnings. In September 2009 he told The Biz Blog of PoynterOnline that "...Philadelphia newspapers stand to make about $10 million or $11 million this year, a meager profit margin of roughly 3 percent."*

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Carnegie Corporation of New York is a philanthropic foundation created by Andrew Carnegie in 1911 to promote the advancement and diffusion of knowledge and understanding among the people of the United States. Subsequently, its charter was amended to permit the use of funds for the same purposes in certain countries that are or have been members of the British overseas Commonwealth. The goal of the *Carnegie Reporter* is to be a hub of ideas and a forum for dialogue about the work of foundations.





# *Carnegie* MEDAL *of* PHILANTHROPY


**2009 medalists Sanford and Joan Weill, Gordon Moore, Rahmi Koç and Michael Bloomberg.**

First awarded in 2001, the Carnegie Medal of Philanthropy has been presented to 23 individuals and families who have dedicated their private wealth to the public good. The 2009 medalists were recognized for establishing and supporting nonprofit organizations in the United States and abroad that span the fields of medicine, education, culture, and science. This year's medalists are Michael R. Bloomberg, mayor of New York City, the Koç family of Turkey, Gordon and Betty Moore of California and Sanford and Joan Weill of New York.

"The 2009 Medalists represent a diverse cross-section of philanthropic commitments and geographic locations. Yet, they have a common philosophy of giving," said Vartan Gregorian, president of Carnegie Corporation of New York and chair of the Medal selection committee. "By celebrating the philanthropic work of these individuals and families, we, the members of the Carnegie family of institutions, seek to highlight the importance of philanthropy in our modern societies."

The awards are presented every two years in recognition of exceptional and sustained records of philanthropic giving, on behalf of the more than 20 organizations established thanks to Andrew Carnegie's munificence. This year's presentation ceremony took place on October 15 at the New York Public Library, with noted author and journalist Bill Moyers serving as Master of Ceremonies.

Andrew Carnegie's philanthropic career began in the 1870s. In "The Gospel of Wealth," which he published in 1889, he outlined his philosophy of giving, which asserted that the rich are "trustees" of their wealth and are under a moral obligation to reinvest it in society in ways that promote the welfare and happiness of the "common man." Andrew Carnegie believed that one who dies rich dies disgraced, because one did not have the imagination or the foresight to dispose of one's wealth for the good of society. By the time of his death in 1919, Carnegie had been true to his convictions: he had disposed of his wealth wisely. He invested a minimum of $350 million dollars—nearly all of his fortune—to advance education, science, culture and international peace.