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August 12, 2008

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Dr. James J. McCarthy, President
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Dear Dr. McCarthy:

Fareed Zakaria criticizes flawed work of the National Academy of Sciences in the enclosed excerpt from The Post-American World (2008).¹ His summary sheds light on the stagnation of the federal science budget. AAAS may be able to correct these problems.

In brief: Historically, scientists have been trusted advisers and partners of government. This privileged status has eroded. The behavior of the National Academy of Sciences and the National Science Foundation has caused scientists to be seen as “just another interest group.”

Background: The “Gathering Storm” (2005) and the K-12 crisis.

In 2005 Congress asked the National Academy of Sciences to recommend “specific steps that can best strengthen the quality of life in America – our prosperity, our health, and our security.” The Augustine Report (Rising Above the Gathering Story: Energizing and Employing America for a Brighter Economy) sounded a loud (and highly selective) alarm about international business competition.² The National Academy of Sciences endorsed the Report and its urgent twenty recommendations of billions of dollars for a wide range of well-intentioned projects for science, engineering, and mathematics (also, large federal expenditures to change the choice of majors by our nation’s undergraduates.)³ The National Science Board/NSF wrote a companion “national crisis” report recommending “aggressive steps” for K-12 national science, technology, engineering and mathematics education.⁴

However (as Mr. Zakaria discusses) both Reports were unreliable and fell apart upon independent examination of their data and analysis. For example, Gathering Storm was alarmed by “600,000 Chinese engineering graduates/year” but its numbers were wrong and wildly exaggerated. (And there is no shortage of U.S. engineers – only about 10% of American engineering graduates are currently employed in engineering jobs by American companies.)

And there are deeper flaws: Gathering Storm purported to be about national economic growth but it was used as a lobbying opportunity. The National Academy of Sciences has 52 economists (including several winners of the Nobel Prize). They did not review the Report.⁵ As the enclosed columns by the economist Robert Samuelson illustrate, the National Academy of Sciences – rather than be a guarantor of scientific integrity – provided a one-sided and selective case.⁶ Nor did it provide a model of the causal pathways and estimate the coefficients involved in successful international business competition – and thus, it was impossible to evaluate responsibly, or defend, how public funds were to be allocated. . . .⁷ Economists are potted plants in an attractive atrium through which the inner circle of the National Academy passes on their way to the elevators and the executive conference room on the top floor.

Accelerating Toward the Cliff

Neither organization withdrew its work to repair the scientific deficiencies. The National Academy of Sciences quietly published and transmitted to Congress a final version of Gathering Storm in 2007, declaring “the recommendations remain unchanged.”⁸ Both organizations began to operate more boldly outside their civic charters to rally national political support to secure funding for the cornucopia from Congress and the President.⁹ They organized a major lobbying campaign (including the CEO’s of fifteen major corporations)¹⁰ to pass and fund an America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education and Sciences [COMPETES] Act.¹¹ There was a great deal of genuine pro-science idealism, enthusiastic symbolic posturing (Double this, increase that, “10,000 teachers for 10 million minds,” everything should be “more” and “better,” 25,000 new 4-year scholarships to be allocated to states on the basis of the size of their Congressional delegations), and social pressures for pro-science loyalty and public silence by critics. However independent, skeptical, and more reliable scientists communicated directly with Congress and opinion leaders. (Dr. Harold Varmus, former Director of NIH, also was an effective public whistle-blower. He told the truth to a national television audience, on The Charlie Rose Show (4/7/2008), that the evidence contradicted the NAS/NSF/NSB claims about a K-12 crisis: public education has been upgraded substantially since the days of Sputnik and there is no national crisis for students who are gifted and talented.)¹²

At this point, a trial has been held and the defendants found guilty. The National Academy of Sciences and the National Science Board/NSF have been demoted from the privileged status of trusted advisers.

Doing Favors for Exxon

[Under separate cover, I will forward a discussion of three ethical problems that also illustrate the changed perception in Washington that these organizations – rather than making simple or hasty errors – have evolved from trustworthy scientific advisers to become political/lobbying organizations. For example, the Augustine Commission included the CEO's and other top current/former officials from Exxon and six other large corporations. They received a *quid pro quo* by the National Academy's endorsement for their agenda of a huge increase in tax subsidies and an accompanying one-sided, uncritical discussion.¹³ (I.e., disregarding its 52 economists, the National Academy's inner circle awarded Exxon et al. and their stockholders a huge, permanent doubling of an annual investment tax subsidy, from 20% to 40%, and extra billions of dollars via expansion (inserted in Gathering Storm without discussion) of the expenditures covered. . . . Corporate America has underwritten many earlier lobbying reports over the years to promote this handout. *Caveat emptor*. not even Republican Congresses and Presidents have been persuaded!)]¹⁴

What AAAS Can Do

We face a critical choice about the future of American science and how trustworthy scientific advice can be available to the government and to the public. I recommend that AAAS take three corrective steps:

1.) A “No Confidence” Resolution and Securing Transparency.

At this point, the ball is in the court of the scientific community. AAAS is the only national organization that can take effective action. We should formally recognize that a loss of confidence exists and ask Congress to assist with securing full transparency and disclosure about these breakdowns.¹⁵ We need full transparency and disclosure: 1.) To give the scientific community a fully-informed basis to adopt systemic improvements and recommend systemic improvements to Congress and to the next Administration; 2.) To assure justice for everyone involved. (We cannot assume that the professional staffs of the National Academy and NSF should take the blame for one-sided documents and selective use of evidence. Ralph Cicerone, the President of the National Academy of Sciences, Charles Vest, the President of the National Academy of Engineering, and Norman Augustine may have indicated the case that they wished to make); 3.) To deter future scientific misconduct, especially when secrecy and claims of privacy are being used to cover up embarrassing or illegal discussions and behavior; 4.) To teach important lessons to students: The Augustine and K-12 cases will be prominently studied by undergraduates across

many fields, in the US and abroad, for many years. They provide realistic and timely insights into the making of American science policy about important national questions, elite and organizational behavior, *hubris*, belief and evidence, temptation and integrity, ethics and scandal; 5.) To send messages to Congress, the news media, the new Administration, and the wider academic community that scientists care about, and want to regain, the role of trusted advisers.

2.) Special Issues of Science.

Congress has not yet received a trustworthy answer to the questions that it asked. The old National Academy/NSF advisory system has reached an impasse and unless AAAS takes action, thoughtful and reliable advice and well-conceived plans will be delayed for many years. I recommend that AAAS organize special issues of Science, with guest editors and advisory Boards, to provide independent, scientific evaluations of recommendations in the Gathering Storm and K-12 Reports. These special issues should include the right of Norman Augustine et al., and the National Science Board, who put their reputations on the line earlier, to defend their individual recommendations; and opportunities to build upon and improve recommendations and offer more innovative ideas for discussion. Special issues also should be devoted to ethics and to systemic-reform: the nation deserves a trusted scientific adviser.

Concerning what went wrong: Many people – including traditional friends of science in Congress – apparently assumed that we had a responsible national science Establishment – i.e., that the National Academy of Sciences and National Science Board/NSF had the needed data systems for strategic planning in their areas of stewardship. But even members of the Augustine Commission eventually discovered that needed data systems are not there. They wrote, in a small print caution in 2007: “[T]he available information is only partly adequate for the committee’s needs . . . definitive analyses of many issues are not possible.” (p. 2). . . . The recent institutional train wrecks notwithstanding, everyone hopes for rapid scientific progress. Thus, one of the tasks for the special issues could be the design of data systems for fast-discovery learning and reality-based government policy.

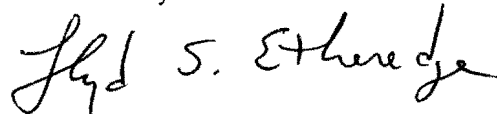
3.) Pressing these issues to resolution.

I believe that AAAS must press these issues. The Gathering Storm Report (especially with eighteen months for revisions) was a Final Exam. When Harvard’s Board of Overseers discovered rationalized unethical and unreliable behavior at the senior levels of the Harvard Development Institute and its USAID projects in Russia, they decided that they were unwilling to spend the resources to micro-manage the needed corrections. They terminated the Institute. The National Academy system was created in the 19th century with extraordinary civic guarantees against out-

side interference – e.g., the right to elect its own lifetime members. It operates behind closed doors. It cannot be verifiably corrected from the outside. And its internal politics – e.g., its treatment of economists – is obscure and probably cannot be reformed from within. For the 21st century, I think that we will want a more open and transparent system, possibly relying more upon ideas drawn from the Federalist Papers.

At this point, successful leadership is critical. Now there are two data points, the Luce Commission scandal and the Augustine Commission problems. It is easy for people (including lawyers, journalists, a new Administration, and members of Congress) to connect the points and observe the downward arc. And there is a substantial history (partly, already known to the AAAS Governing Council) of off-the-record warnings and shots across the bow (e.g., by the former AAAS President, David Hamburg and the Carnegie Commission; by the Times Editorial Board; now *inter alia*, from Newsweek International, the Wall Street Journal, and the Washington Post) about the draw of these organizations to become Washington-centered and disregard scientific integrity. They have had many warnings and second chances.¹⁶ If AAAS does not handle this, I believe that others will. Right now, most scientists here and abroad (and the next generation of scientists in our colleges and universities) still trust the governance and integrity of scientific institutions and the self-correction of science. But things could become a great deal worse. And – for the future of science and everyone who can benefit from scientific progress – things should get a great deal better.

Yours truly



Dr. Lloyd S. Etheredge, Director
Government Learning Project

Enclosures: Excerpt from Zakaria, The Post-American World, pp. 187-189.

Robert Samuelson, "Sputnik Scare, Updated," Washington Post, May 26, 2005 and "A Phony Science Gap?" Washington Post, February 22, 2006.

Yudhijit Bhattacharjee, "New Analysis Questions Push for More Degrees," Science, November 16, 2007, p. 1052.

cc: AAAS Council

¹ Mr. Zakaria is Editor of Newsweek International, a member of the Trilateral Commission, and a Trustee of Yale University.

² (Washington, DC: National Academy Press, 2007), p. 2. Online at http://www7.nationalacademies.org/cosepup/COSEPUP_Publications.html. The online version, misidentified on the Publications Page as the 2005 Report, is the 2007 “final” report. The 2007 report has to be evaluated carefully because the text includes changes that probably misrepresent the actual basis for the original recommendations.

³ The National Academy of Sciences and the National Science Foundation did not engage the scientific integrity to analyze alternative theories. For example, an important competing theory is that American undergraduates should select their majors based on comparative advantage – i.e., selecting fields in which they have interest, ability, and love to do the work well. Thus, in the long run, rather than imitating a possibly mistaken and temporary Asia zeal and intense societal pressure for science and mathematics, America’s comparative advantage might be educational institutions that help to maximize the potential of each individual.

⁴ National Science Board, National Action Plan: Science, Technology, Engineering and Mathematics Education System. October 30, 2007. The Chair of the National Science Board, Steven Beering, wrote that America “is *failing* [emphasis added] to meet the [STEM] education needs of U. S. students” and urged annual expenditure increases of billions of dollars as “*absolutely essential* [emphasis added] for the continued economic success of the Nation and its national security.” (p. v).

⁵ There is a troubling correlation between fields whose federal support was recommended to double and those who were represented prominently in the Commission processes v. those fields that were not included.

⁶ Robert J. Samuelson, “Sputnik Scare, Updated,” Washington Post, May 26, 2005, p. A27. See also his “A Phony Science Gap?” on February 22, 2006, p. A15, Sebastian Mallaby, “The Fake Science Threat” in the Washington Post of February 6, 2006, p. A15, and Yudhijit Bhattacharjee, “New Analysis Questions Push for More Degrees,” Science, November 16, 2007, p. 1052.

⁷ In earlier years, when Congress received a recommendation to build the COBE satellite, scientists could be relied upon to have done their homework. There was a rigorous and thoughtful analysis of more than 100 competing theories that would be tested. The National Academy has implied that it had to do a rushed job, and that the Augustine Commission was required to recommend national policies without public hearings or enough time for good analysis, but the reasons are not fully persuasive. And the reasons do not apply to the eighteen months between the 2005 document (that the National Academy now calls a “draft”) and the 2007 version.

⁸ Gathering Storm (2007), p. 2.

⁹ The NAS organized a national meeting on August 10, 2006 to bring together “leadership of the industry, government, research and educational community from all 50 states and the federal government” and a follow-up convocation was held in Washington, DC on April 29, 2008. Press releases are online at <http://www7.nationalacademies.org/gatheringstorm/>.

¹⁰ See also: “Endorsements: Conference Report. H. R. 2272, the America COMPETES Act” online at http://democrats.science.house.gov/Media/File/Commdocs/hr2272_org_support.pdf. Corporate support and pressure helped to pass the Act, but the Administration and members of Congress have been unwilling to move beyond this symbolic statement to provide funding.

¹¹ See also Justin Pope, "Report: US Behind in Doubling Science Grads," Associated Press - Yahoo News. July 15, 2008. Fifteen CEO's are supporting the Augustine/NSF Reports and have told Congress [i.e., without yet providing a persuasive analysis – LE] that the country will need "400,000 new graduates in the so-called STEM (science, technology, engineering and math) fields by 2015 . . . but the number of degrees has flattened out at about 225,000 per year." However, note that one of the rationales of "need" – by a company that says it spends \$780 million/year on training – is to reduce its training costs. The National Academy's political initiative includes both idealistic "science is good" advocates (who hope for scientific breakthroughs) – but, also, there are corporations with very different, prosaic bottom-line agendas (a better disciplined US workforce, a doubling of the number of engineering graduates that will permit lower wages, and corporate training costs that are partly reassigned to colleges and universities.) The (continuing) ambiguities and stonewalling and lack of rigorous, corrective scientific analysis by the National Academy and NSF may help to create and hold together such a broad and diverse political coalition, but we do not yet know if either agenda will be well-served by the Augustine projects.

¹² Dr. Varmus received the Nobel Prize in 1989. His honesty and candor probably contributed to his ability, as NIH Director (1993 – 1999), to double the NIH budget. Varmus said that the K-12 STEM initiatives were "cultural." This may be right but – if so – the NAS/NSF/NRC case needs to be rewritten and based on models of culture and, then, cost-effective policies need to be identified on the basis of data and analysis of causal pathways and coefficients.

¹³ Seven of the twenty members came from the corporate world: Exxon, DuPont, Intel, Eli Lilly, Merck & Co, Lucent Technologies and Lockheed Martin. Others served concurrently as Board members of beneficiaries – e.g., two members of the Augustine Commission (Shirley Ann Jackson and Charles Vest) were on the Board of Directors of IBM in 2005. Anita K. Jones was elected to the Board of BBN in 2004. At the time of his chairmanship, Norman Augustine also apparently was a member of the Boards of Proctor and Gamble, Riggs National Bank, and Conoco-Phillips. Other members (e.g., Robert Gates) also probably had 2005 corporate board memberships and/or stock holdings requiring legal disclosure. Thus, it appears that a voting majority had conflicts of interest that were undisclosed, but should have been ethically and legally disclosed. The National Academy of Sciences is legally required to provide "unbiased and impartial scientific advice, both in fact and in appearance."

¹⁴ Nor did Ralph Cicerone (President of the National Academy of Sciences) and Charles Vest (President of the National Academy of Engineering), the senior officials with legal liability, disclose the annual donations and income to their National Research Council [now about \$65 million/year from private and nonfederal sources in 2007] by the corporations and lobbying groups whose members served on the Augustine Commission and the working group that slipped-in the Gathering Storm tax give-away. It is unclear whether Norman Augustine and other members were required to file conflict of interest forms concerning stock owned in companies that would receive immediate and substantial benefits if Gathering Storm was believed. However, I believe that they should have informed readers of their Report, regardless of whether the National Academy has rules against telling the public of such conflicts.

¹⁵ Transparency should include all emails, correspondence, records of telephone conversations, etc. that help to understand the behavior of individuals in their organizational set-

tings. We may need to instruct AAAS legal counsel to take steps to assure this full disclosure: Since the earlier Luce Commission scandal the senior officials of the National Academy have been unavailable for rational collegial discussions. (For example: there have been strong internal legal arguments that all Academy officials must defend the Academy's actions and reports in public.) However AAAS has a right to insist that the norms and values of the scientific community be honored, even if federal law and its own new rules do not compel the Academy to be transparent and accountable.

¹⁶ I do not understand the NSF/National Science Board dysfunctions well enough to have an informed judgment. However, I suspect that any solution should include a separate and highly capable staff and legal counsel for the National Science Board. Permitting the Director of NSF to Chair the Executive Committee of the National Science Board and provide its staff prevents the National Science Board from doing its job to detect and correct problems in NSF programs and compensate for the limitations of the current NSF Director and several of his appointees.