

2005 ASHG AWARD FOR EXCELLENCE IN HUMAN GENETICS EDUCATION Education for Health Professionals and the Public*

Joseph D. McInerney

National Coalition for Health Professional Education in Genetics



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I am extremely grateful to receive this award, because I know and admire greatly several of the people who have won it previously, and it is an honor to be on the same list with them. I am even more grateful that ASHG recognizes the importance of education in the form of this award and other activities. Many scientific societies profess interest in education and express consternation at deficiencies in science education at all levels. Only a few, however, actually put significant resources—fiscal and human—into ameliorating those deficiencies. ASHG is one of them.

If I have been effective in promoting genetics education, it is because I have been favored with the ingredients for success.

First, one needs something interesting and important

to say. The rich intellectual history of human genetics and the new knowledge that investigators worldwide continue to generate ensure that educators will have interesting, important, and challenging content in perpetuity.

Second, given that rich history and the steady accumulation of new information, one needs help in saying something coherent and useful to learners. My challenge for almost 30 years has been to translate complex, genetics-related information for diverse audiences, ranging from K-12 students to undergraduates and practicing health professionals. That is never an easy task. The overwhelming amount of content in human genetics forces educators into what one commentator has called “epistemologic surrender”; that is, there is so much that one *could* say that one has to settle for what one *must* say. That determination is tricky, and it is easy to boil away the accuracy of the content as one distills out the essence of genetics for nonspecialists. It helps, therefore, to have knowledgeable and willing colleagues to assist with the translation of the content into meaningful instruction. So many members of ASHG—hundreds, quite literally—have helped me with that process during the last 3 decades that it would be impossible to recall all of them. I do know, however, that no member of this Society has refused a request for assistance.

No one has helped me more with what to say and how to say it than Barton Childs, the Johns Hopkins pediatrician and geneticist who has been teaching me about human genetics and its role in health and disease since the 1970s. Dr. Childs’s ability to synthesize conceptual insights from genetics, evolution, development, medicine, and education has been a remarkable gift for many of us in this Society, and, in the tradition of the best teachers, he has shown me not what to think, but how to think. I would have had little impact on genetics education were it not for Dr. Childs’s guidance and his generosity with his time and his expansive knowledge.

Third, one needs vehicles for the dissemination of educational projects and ideas. I have been fortunate enough to serve as executive director of two organizations—the Biological Sciences Curriculum Study (BSCS) and the Na-

Received November 30, 2005; accepted for publication December 5, 2005; electronically published February 1, 2006.

Address for correspondence and reprints: Joseph D. McInerney, National Coalition for Health Professional Education in Genetics, 2360 West Joppa Road, Suite 320, Lutherville, MD 21093. E-mail: jdmcinerney@nchpeg.org

* Previously presented at the annual meeting of The American Society of Human Genetics, in Salt Lake City, on October 29, 2005. *Am. J. Hum. Genet.* 2006;78:374–376. © 2006 by The American Society of Human Genetics. All rights reserved. 0002-9297/2006/7803-0006\$15.00

tional Coalition for Health Professional Education in Genetics (NCHPEG)—that have broad reach and impact. Francis Collins, director of the National Human Genome Research Institute, is a founder of NCHPEG and the current chairman of our board of directors, and I am in his debt for his steadfast support and sound guidance of our programs.

Fourth, one needs financial support, and I have benefited from funding from a broad range of agencies in the public and private sectors. The Department of Energy (DOE) has been especially supportive, providing grants through its Ethical, Legal, and Social Implications program for six major projects since 1990.

Clearly, I have had great advantages that enhanced my ability to promote genetics education in the U.S. and abroad. There is, however, is a great deal yet to do. Genetics education for health professionals, for example, must overcome the pervasive perception that genetics does not matter in standard, day-to-day patient care and that the genome projects are interesting but arcane scientific and technical exercises whose practical applications are limited at best. The sessions at any ASHG meeting put the lie to those views for those who have the content background to make the connections. But we need considerable help from the genetics community to effect the translations for practitioners and for those who control how care is delivered and paid for. I am especially gratified by the range of health professions involved in NCHPEG's work and by the interest in our new programs that highlight the role of genetics in common disease. We have much more work to do, however, to demonstrate that a genetically based view of health and disease is central to the future of health care and to deliver meaningful genetics content to our nongenetics colleagues at the point of care.

The challenges and opportunities are equally substantive in public education and especially in science education at the K-12 level. We are ~20 mo shy of Sputnik's 50th anniversary. That basketball-size, 183-pound Soviet satellite ushered in the Space Age and eclipsed, for a time, America's own efforts in that arena. Sputnik's appearance over the U.S. every 98 min was a painful and ignominious reminder of America's scientific and technological shortcomings, and so Sputnik also ushered in an unprecedented wave of reform in science and mathematics education in this country. In biology, that reform began ~15 years after the identification of DNA as the transforming principle and ~5 years after the elucidation of the molecule's structure. The reform movement propelled the high school biology curriculum from a didactic focus on descriptive natural history that was, ironically, largely devoid of Darwinian perspectives into the era of modern biology and inquiry-based instruction. Perhaps most important, this educational reform also restored evolution to a prominent, pervasive role in the curricu-

ulum after a 30-year absence in the wake of the Scopes trial.

ASHG played an indirect role here. Bentley Glass, who did his Ph.D. with our first president, Hermann Muller, and later became president of ASHG himself, joined other prominent scientists from diverse disciplines in spearheading the development of revolutionary instructional materials in the sciences and mathematics. Dr. Glass became the first chairman of the BSCS board of directors, beginning in 1958, and remained associated with the organization until his death in January 2005, at the age of 99. I studied with Dr. Glass at SUNY Stony Brook and spent 22 years at BSCS as a result of his influence.

Dr. Glass and his colleagues realized that the development of high school educational materials in biology was too important to be left to publishers, and they recruited many first-rate scientists to the effort. Unfortunately, large segments of the scientific community have since all but abandoned their responsibility to precollege education and to education of the public in general. That must cease, because there is again too much at stake. This time, the threat is not the specter of the Cold War and a large, authoritarian regime supported by better-prepared scientists and engineers. The threats now are more insidious: an erosion of scientific and economic competitiveness in a world ever more dependent on science and technology, a growing anti-intellectualism and a disregard for a life of the mind, the willingness to assert—from the highest levels of government—that pseudoscience and faith-based explanations for natural phenomena are coequal with explanations rooted in the methods of science, and the ongoing struggle to teach evolution—the very foundation of biology—in the face of the pleasant fictions that still hold much of the population hostage to ignorance.

These threats are antithetical to everything that science stands for and everything that it is at the heart of the social, political, and economic structures necessary to support science itself. The scientific community cannot afford to be on the sidelines. We must be intimately engaged in the ways in which our science—all of science—is interpreted for the public or we will suffer the consequences of our neglect.

Accordingly, an invitation to help with science education—and the temptation to decline the opportunity—should recall this phrase from the classic commercial for Fram oil filters: “Pay me now, or pay me later.” We can pay now—with our time, our expertise, our political influence—or we will pay much more dearly later, as we deal with badly prepared students, with a public that does not understand even the rudiments of what we do or why we do it, and with public servants who cannot distinguish real science from junk science. As always, preventive maintenance is must less costly.

In addition, we all must work to reverse the sad reality

of this observation by Jacques Barzun: "Teaching is not a lost art, but the regard for it is a lost tradition." We owe our interest in science, even our positions in the scientific community, to good teachers, so we should honor good teaching and encourage and reward it in our institutions. That is especially important for those in senior academic positions. They must encourage their more-junior colleagues to master the skills of sound teaching and to contribute to the improvement of science teaching outside their institutions, even if those activities do not add to credentials for tenure and promotion. At the very least, we should not penalize young faculty for such interests and endeavors. I know from more than 25 years' experience in this Society that working scientists and clinicians at all levels can make a difference in the quality of the science education for our fellow citizens, and we should help in our own communities as needed. Those looking for ways to become involved

should contact the ASHG office to explore the various programs the Society directs.

Some years ago, during a phone conversation with Barton Childs, I was lamenting the glacial pace of educational reform. A few days later, I received from him a handwritten note that included this statement from Edmund Burke, the 18th-century Irish political philosopher: "Society is a contract between the living, the dead, and the not-yet-born." Dr. Childs wrote, in his usual elegant fashion, that I simply had to get used to the fact that I might not live to see the true impact of my efforts in science education. That is a sobering realization, but true nonetheless. Education is at the very heart of Burke's contract: it is the vehicle that carries our accumulated wisdom—and our hopes and dreams—from one generation to the next. I look forward to continued work with the members of ASHG to fulfill our part of Burke's contract, and I thank the Society most sincerely for the wonderful honor it has accorded me.