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LETTERS

Minorities in Science: The Dialogue

Science is to be commended for its lengthy coverage of Minorities in Science (Special Section, 13 Nov., p. 1175). Too little attention is being paid to the underutilization of human resources in the United States.

Along with my commendation, however, I strongly disagree with the pessimistic tone of one of the sections of the article "What went wrong: Why programs failed" by Calvin Sims (p. 1185). While the progress of significant numbers of minorities into the science professions is less than hoped for, even the statistics quoted in the article belie the overly pessimistic tone of the article. There has been a 50% increase in minorities in the sciences and engineering professions and a 365% increase in engineering degrees! While the figures are not the basis for jubilation when one considers that the base was so small in the 1960s and 1970s, they are hardly reason for the gloom and doom of the article.

The National Institutes of Health (NIH) minority programs MARC (Minority Access to Research Careers) and MBRS (Minority Biomedical Research Support) come in for much criticism. I can speak from firsthand experience with the MBRS program at Chicago State University. CSU is a charter member of the program. I have been a research participant from the date of its initial funding (1972) and its program director for the past 2 years. In many ways CSU is typical of the 80-plus schools currently being funded by MBRS. We have about 8000 students, of whom 87% are minorities (primarily African-American). In 1991, we awarded 17 B.S. degrees in biology and chemistry and 4 M.S. degrees in biology. While these numbers may be considered small, they represent the majority of the science degrees awarded to African-Americans in Illinois that year. In the 20 years that CSU has participated in the MBRS program, 270 students have been directly involved; 214 have received B.S. degrees and 42 have received M.S. degrees (a 95% graduation rate). More than 100 have continued on to graduate or professional programs, and 32 doctorates have been awarded to CSU-MBRS alumni.

To say that "NIH ran its programs for 20 years without tracking students" overlooks the very effective control that many MBRS participating schools have over their programs. I have no doubt, on the basis of graduation statistics and feedback from alumni, that our MBRS program is a success.

Warren V. Sherman
Department of Chemistry and Physics,
Chicago State University,
Chicago, IL 60628

The report on Minorities in Science was long overdue, and I am glad *Science* took the initiative to present it. I am concerned, however, that the first two articles are overly pessimistic and that many good programs will be cut because of this. While I agree with Walter Massey and Luther Williams that programs need more accountability, I cannot agree that the "programs have failed." It seems to me that even the small gains made by Asian-Americans and Hispanics (p. 1180) in getting Ph.D.'s are a cause for celebration. Would these numbers have increased without the MARC and MBRS programs? Are all the other MARC and MBRS participants to be labeled "failures" because they did not pursue Ph.D. degrees?

I would not be at Northwestern University if it were not for the MARC program, which in 1983 allowed me to spend a postdoctoral year in the laboratory of Susan A. Gerbi at Brown University. That experience made me realize I could do molecular biology. Without it, I would never have applied for the NIH grant that has supported me for the last 2 years. The programs are working but, with the magnitude of the problem, the gains may be much smaller than any of us would desire.

Sister Catalina Fresquez
Department of Biochemistry,
Molecular Biology and Cell Biology,
Northwestern University,
Evanston, IL 60208–3500

Science may be congratulated on developing their first report on Minorities in Science, but we beg to differ on the analysis of the MBRS and MARC programs. The University of Hawaii at Manoa has been fortunate to have both programs since the mid-1970s and to track sufficient of its graduates from the programs into M.P.H., Ph.D., M.D.,

and M.D./Ph.D. programs to point to a success rate approaching 70%.

We focus our undergraduate minority students on graduate careers, but we do not count admission of any of our graduates into medical school as a failure; we need to produce a broad base of health professionals. No, we have not yet produced superstars, and if you are to judge our programs by whether our graduates join the increasingly select group of R01 investigators, then we are just as much a failure as the many majority scientists who are "approved but not funded." We have, however, produced hardworking, competent benchworkers and skilled technicians—the journeymen and -women of science—and a graduate who is teaching high school science and using his research experience to provide a role model for the next generation. What did you expect in 20 years? Look at the history of the elite majority schools for the time scale to produce the base of the success triangle.

Frederick C. Greenwood*
Healani Chang†
Pacific Biomedical Research Center,
University of Hawaii at Manoa,
Honolulu, HI 96822

*Program director, MARC program. †Program director, MBRS program.

In a section titled "No follow-up," in the article by Sims, the statement is made that "NIH ran its programs for 20 years without tracking students." This overlooks an evaluation of the MARC programs sponsored by National Institute of General Medical Sciences at NIH and carried out by the Institute of Medicine (*1*).

In this study, it was discovered that 69% of the 498 former trainees surveyed were either enrolled in postbaccalaureate programs or had earned advanced degrees in science or medicine. Of those former trainees in the labor force, more than 70% were in jobs related to science and technology.

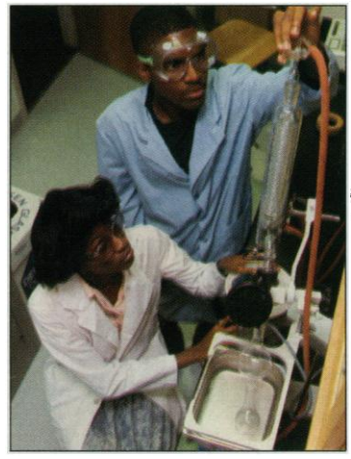
Howard H. Garrison
Aspen Systems Corporation,
Suite 701, 962 Wayne Avenue,
Silver Spring, MD 20910

References

1. H. H. Garrison and P. W. Brown, "Minority access to research careers: An evaluation of the Honors Undergraduate Research Training Program; A staff paper" (National Academy Press, Washington, DC, 1985).

The Minorities in Science special section was excellent, and I hope it is followed up each year. It addresses an issue that is crucial for our "culture of science" and for the cultures of our society.

As noted (p. 1216), historically black colleges and universities (HBCUs) play a crucial role. One aspect of enhancing that role is faculty development. I have been made acutely aware of this through participation in the Faculty Resource Network program—a consortium made up of New York University, 15 regional liberal arts colleges, and 10 HBCUs. Through this program I have hosted three African-American faculty members in my laboratory. There was a quid pro quo here, as they were able scientists who materially contributed to the overall effort of my laboratory. The experience has contributed to their professional development and to mine.



One thing runs all through the special report—the importance of "mentoring." I know my interest in minority education and willingness to act on that interest are not unique among faculty members at majority institutions. There should be some way that such individual interests could be exploited rather than creating huge programs that become self-perpetuating creatures that lose sight of the goal. The NIH program for supplementing RO1 grants is a step in the right direction.

Allen B. Clarkson, Jr.
Department of Medical and
Molecular Parasitology,
New York University Medical Center,
New York, NY 10010

The 4681 bachelor's degrees in engineering granted to minority students in 1992 represent a 400% growth since 1973. No other profession, science-based or otherwise, can point to such progress. If we are going to reach parity, however, we have to solve the retention problem. Current efforts focus far too much on perceived student deficiencies.

To improve minority retention, we must eliminate the inhospitable environment for minority students in undergraduate science and engineering programs—low faculty expectations, isolation from the mainstream, hostility from peers, and lack of effective mentoring. I don't think we can expect to do this successfully by awarding millions of dollars to those within a community that has embodied the very antithesis of pluralism.

The emerging government programs ignore the single greatest cause of minority engineering student attrition: insufficient financial resources. Instead of creating welfare-style bureaucracies, where the bulk of the funds support professional and administrative salaries, the National Science Foundation (NSF) could channel $25 million a year directly to needy students through an *effective* NSF scholarship program and virtually guarantee a doubling of minority graduates over the next 5 years.

While self-examination and criticism are essential, our progress must be assessed in the context of the society as a whole. True, two decades of effort have not led to equal opportunity in science and engineering. It's also true that the nation has not come to grips with larger social problems. How much progress have we made toward a creating a truly equitable, pluralistic society since the 1960s? Can we afford to stop trying?

George Campbell Jr.
President,
National Action Council for
Minorities in Engineering,
3 West 35th Street,
New York, NY 10001

The Minorities in Science special section was well received by many because it addressed the many sides of the pertinent issues with candor. The kind of communication presented is requisite for eradicating the myths and misunderstandings of what really works for minorities. The concepts of "accountability" as stated by Luther Williams, "commitment" as mentioned by Eloy Rodriguez, and "high achievement" as expressed by Freeman Hrabrowski remain the key issues for successful programs.

Many minority professional organizations and societies have played major roles in the career development of minorities. Members have served as science fair judges, role models, mentors, and speakers for science career days. The National Organization of Black Chemists and Chemical Engineers, Minority Women in Science, Organization of Black Scientists, and Society for the Advancement of Chicanos and Native Americans in Science are just a few. I am proud that 11 members of my organization are mentors for the Meyerhoff Scholarship Program at the University of Maryland, Baltimore County.

Elvira Doman
President,
D.C. Metropolitan Organization
of Black Scientists,
Post Office Box 1763,
West Hyattsville, MD 20788

Scientists of Color is an organization of graduate students at the University of California, Berkeley, devoted to promoting the interests of ethnic minorities in the biological research sciences. We were pleased to see the discussion regarding the present paucity of scientists from historically underrepresented ethnic groups in the 13 November issue of *Science*. However, as "minorities in science," we recognize one important factor as being omitted from this report—the continued prevalence of prejudice and racism in the sciences.

We disagree with Daniel E. Koshland, Jr.'s assertion in his editorial (p. 1067) that "the world fortunately has changed" with respect to the existence of prejudice. Our collective personal experiences belie this sentiment. While the world *has* changed with respect to prejudice, this change has simply forced prejudice and racism to adopt more genial appearances. Koshland's statement that an overdone discussion of prejudice will discourage young minority students from seeking scientific careers is an example of the attitude with which we are presented. If an institution has a problem with racism, attempting to hide that problem from minority applicants will only exacerbate it. We must recognize and address these issues fully if we are ever to overcome them.

We do not believe that our cultures and upbringings stand as obstacles to achievement in the scientific community. The scientific community must see beyond the stereotypes and recognize the benefits to be gained by regarding scientists as individuals with varied backgrounds and heritages and not as the representatives of their ethnicities.

Derrick T. Brazill
Steven J. Mack
Co-coordinators,
Scientists of Color,
Departments of Molecular and Cell Biology, Integrative Biology, and *Plant Biology,*
University of California,
Berkeley, CA 94720

If we truly wish to have greater representation of African-Americans, Latinos, Native Americans, and all women in the scientific community, there will need to be change. Colleges and corporations will have to change the way they recruit and not look only to Ivy League and other "prestige" schools for their future hires; executive search firms specializing in racial minorities must be *seriously* considered as sources of talent and not merely an easy way of satisfying the Equal Employment Opportunity requirements; and the way we teach science will also need to change—science educators will have to accept that not all students learn in the

same way, nor do they all have the same skills; every student does not need to be the lead scientist on a project. The factors that contribute to the under-representation of minorities go far beyond "I like math/she hates math," but the solution begins with attempting to recognize pieces of the problem.

Paul Evans
Senior Science Developer,
Children's Museum, Boston,
Post Office Box 1830,
Boston, MA 02205

We would like to comment on the role graduate students can play in supporting minority recruitment. Two years ago, we founded the Young Scientist Program, a Washington University student-run collaboration with the St. Louis City Public Schools that offers high school students funded internships in research. Each year, we recruit the top juniors in the city from a student population that is 80% African-American and 90% low income. Participants (eight in 1993) select their own projects, meet for tutoring sessions in the spring, and join graduate students in medical center labs over the summer to conduct their research. The program emphasizes the development of supportive and enduring one-on-one relationships between high school students and their graduate student mentors.

As both working scientists and fellow students, graduate trainees are uniquely able to foster young people's interest in science during the critical high school period described by Sims as the root of the recruitment problem. Our experience demonstrates that graduate student volunteers also have a striking commitment to science education, which the NSF's Luther Williams notes is often lacking in failed programs (p. 1186).

James McCarter
Matthew Schreiber
Rajiv Bhatnagar
Division of Biology and Biomedical Sciences,
Washington University School of Medicine,
St. Louis, MO 63110

A primary aspect of the "pipeline problem" is the very idea that the education of anyone, particularly minority students, can and should be compared to a pipeline! This unfortunate metaphor reveals a fundamental clash between students' needs and the perspectives of many in the higher education hierarchy. Take a good look at the stories told by Walter Massey and Calvin Sims. At critical junctures, other people—especially mentors or professors—treated them with dignity and compassion and challenged them to further their studies. Does this sound like a pipeline? The image of minority students as blobs of leaking oil rightly belongs to the majority research university mentality. Until the "pipeline" paradigm is dismantled and we can start treating students as human beings, the progress for minority students (and others, too) will be glacial whenever they come into contact with majority research institutions.

John Knox
Department of Atmospheric
and Oceanic Sciences,
University of Wisconsin,
Madison, WI 53706

I read the section on Minorities in Science with great interest. It is true that cultural difference is the primary reason for the glass ceiling experienced by the majority of Asian-American scientists. Subtle discrimination is the hardest type of discrimination to fight against. It is only human nature to select those who are like ourselves to associate with in those informal situations where professional bonds are established. When it comes to recommending someone for an award, a committee, or a panel, it is natural to think of those for whom a deeper respect and appreciation have developed through these informal associations. Asian-Americans do not have the image of a president, a dean, or even a chairperson. In dealing with conflicts, some Asians may take a nonconfrontational approach expecting, from their cultural tradition, that others will respond in kind and that justice will prevail in the end. Unfortunately, this is often viewed as a weakness, as being unable to stand up for one's rights. Opportunities for administrative positions may pass us by, because it is still difficult for most to accept us as supervisors. The few who have succeeded are in special circumstances, or have come from fields where Asian-Americans are highly represented, such as engineering and pharmacology. In these fields, language and cultural differences are merely differences, not problems. The difficulties immigrant Americans face should subside with the future generations of American-born minorities. I myself am grateful to be able to do science in the United States; that would not have been possible in any other country. Only in America can a minority's right be so openly discussed.

Z. Renee Sung
Department of Plant Biology,
University of California,
Berkeley, CA 94720

While I agree that there is a strong case for funding educational science programs for all people at all levels, I wonder what Americans' perception of "underrepresented" is. In today's politically correct, egalitarian, and parity-seeking America, it seems that an "underrepresented" minority is one whose presence is not proportional to their nationwide abundance. If this definition were to apply to all races and all areas of profitable endeavor, then white Americans must be "underrepresented" in professional basketball; surely Asians, who constitute a significant and growing percentage of America's population, are "underrepresented" in all professional sports as well as the lucrative multimillion-dollar music video industry. Is this reasonable and sufficient justification for the government to spend money to encourage Asian youths to sporting excellence, to become the next Michael Jordan or Carl Lewis so that Team America of Olympics '96 will be "fairly" represented by all ethnic groups?

In an age of budgetary constraint, surely the precious dollars set aside for science education and research should be used to provide *equal* opportunity for *all*. Or do Americans prefer diverting it to special interest groups, so that *all* can be *proportionally* represented in science, even if proportional representation means diminished opportunities for better qualified but overrepresented segments of the population?

H. V. Wong
56 Ferry Road,
Oxford, OX3 0EU, United Kingdom

In the special section on Minorities in Science, the usual reasons are given for why minorities do not study science (poor education, prejudice, economic deprivation), and they are certainly valid. But the situation is far more complex, in my experience (30 years as a teacher in the New York City

schools, in affluent suburban public and private schools, and in Nigeria).

It is presumed that if minorities are just given the chance, they will flock to the sciences. Is the scientific culture somehow "superior" to any other? Many of the brightest among the minority students may just not be interested—and their reasons may be sound.

The problem is not being looked at realistically. The two minority groups most "at risk" (African-Americans and Hispanics) both have strong cultural values that differentiate them from the mainstream American culture. The scientific tradition is not emphasized in the root cultures in Africa and Latin America. The "science is fun" syndrome is a characteristic American attitude, but science is part of a broader learning tradition that has not been adopted by all Americans.

American black colleges send students to medical and engineering schools. Is anyone saying to these students, "Don't go into particle physics, neurology, molecular biology, or mathematics"? Is there a lack of talent or a lack of interest? As science educators, we should stop trying to make everyone conform. If the minorities aren't interested, that does not mean they don't have the ability.

Joseph D. Ciparick
315 East 86th Street,
New York, NY 10028

An annual minority section would certainly be most helpful. However, it would be much better to include more about minorities and women in the body of the journal, for as long as minorities and women require separate sections, we indeed have no more than "outsider" status.

Gertraude Wittig
Department of Biological Sciences,
Southern Illinois University,
Edwardsville, IL 62026

Corrections and Clarifications

In the special section "Minorities in science: The pipeline problem" (13 Nov., p. 1175), the graph on page 1199 showing the field distribution of employed scientists and engineers by ethnicity should have been labeled "Perçentage" along the *x* axis. Also, the designation "Engineers" should have read, "Engineers, total." Labeled correctly, the graph would indicate, for example, that among all employed white scientists and engineers in 1988, about 50% were scientists and 50% were engineers. Of employed black scientists and engineers, about 70% were scientists and only about 30% were engineers. Among Hispanics, the breakdown was about 45% scientists and 55% engineers.