
❖❖ COLLOQUY ❖❖

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<u>Contents</u>	<u>Page</u>
What Should We Be Teaching Students of Color in the Natural Sciences? Aldemaro Romero, Environmental Studies and Biology	1
The Black Book on Red Blood Jeremiah Reedy, Classics	4
Wallace Research Grant Report--Detroit Summer Karin Aguilar-San Juan, CNAS and Sociology	7
The Case for Intellectual Diversity at Macalester Jeremiah Reedy, Classics and G. Michael Schneider, Math/CS	9

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What Should We Be Teaching Students of Color in the Natural Sciences?

Aldemaro Romero (Environmental Studies and Biology)

In the twenty years of my professional career that I have been participating in professional meetings, one of the most constant characteristics of those events has been the almost complete uniform phenotype of the participants. In other words, with very few exceptions, everybody is white.

Since the time I was an undergraduate in the late 60s and early 70s, women acquired a numerical majority among biology majors almost everywhere, and in the 80s and 90s, we have seen an increase in the participation of Asian-Americans in the sciences, particularly in computer science, physics, and molecular biology.

Since the meetings I usually attend are those in the organismal biology area: evolution, ecology, zoology and the like, as opposed to molecular types, I have always wondered why there are still so few African-Americans and Hispanics in those areas.

When I think about the kind of conversations I have with my very few peers of color, interestingly enough, we very rarely talk about race or ethnicity and, if so, only in passim. I have always had the impression that maybe because there are so few of us, we all feel that we have never been discriminated against. For example, my recollections as a graduate student at the University of Miami are filled with memories of having been given many opportunities. I do not think they were given to me as a free ride; I always felt that I earned them but, by the same token, none was denied and I took full advantage of each one of them.

Curiously, most of my conversations with my colleagues of color gravitate around Science (yes, with capital S). I always have the impression that my peers of color and I have more in common, intellectually, than what I have with most of my white peers in that we are profoundly neo-Darwinians, we try to connect things and, more importantly, we have a sense of history of science.

One may argue that such conditions may be the result of professional bias; after all, all students of evolution are, by definition, students of a science that is historical in nature. But I do not think so. I think that unlike most of our white colleagues, we enjoy discussing about the historical circumstances of scientific discoveries. As a matter of fact, the elective class with the larger proportion of nonwhites I ever taught was History of Biology. That was a class that impressed me a lot because the students who took it not only showed a tremendous interest in the subject, but also when I read the papers they wrote, I felt I learned more from them than from

any others ... and all of them were undergraduates.

Thus, what is the reason for so few people of color in organismal biology and geology (the latter being another historical science)? I cannot speak for geology since that goes well beyond my area of expertise, but as a trained and practicing biologist, I want to propose the idea that we have been creating an environment that is essentially hostile for people of color. And the issue is not racism.

The way biology is taught today is heavily influenced by the big demand of people interested in the health-related professions; therefore, it is oriented toward memorization, a practice whose ultimate aim is to make sure that they pass whatever entry exam they need to go to medical, dental or nursing school. And many students with no real interest in the health-related professions are given the impression that that is biology. Too bad. Yes you can still be a good doctor or nurse not ever having read Darwin, but that is not science, that is professional certification. Even many of the things that health-related students are taught are rather quite useless. I remember many years ago when teaching Human Anatomy and Physiology to pre-med and nursing students, all the textbooks emphasized the memorization of the Krebs cycle. I always wondered how much better that makes my dentist or the nurse that takes up my blood pressure very time I go to the doctor. It may be good to facilitate standardized testing, but it does not make them better professionals.

So people of color interested in biology as a science, that is, as a way to better understand nature, encounter a climate, at both undergraduate and graduate level, where memorization reigns and that what is really exciting is "molecular stuff." Don't take me wrong. I appreciate the tremendous contributions that reductionism has rendered biology and the tools provided by molecularists have been enormously useful, from evolution to forensic science; I have taught molecular genetics myself and know how important that is. Yet, the approach of many molecularists is that one should be always looking for the latest technique ("technique-of-the-month club"), that it is fun to replicate someone else's methodological approach with any other subject, and that it is fine to follow a leader or, even worse, to follow the crowd.

As a consequence of that, we are producing a bunch of biologists for whom evolution is no longer the central theme of their science, who have never read Darwin (not to speak of Mayr, Dobzhansky, or Simpson) and who, in sum, have no perspective of biology as a science. They seem to believe that if you know how to use the sequencer, then you know how to do science. I wonder what my colleagues that teach English would think of English majors who have never read Shakespeare, don't know English grammar very well, but know how to use the spelling and grammar check in their word processing programs. Can they really write?

Lately, we have been focusing on improving the background of biology students of color by offering them sort of remedial courses assuming (sometimes rightly, sometimes wrongly), that

they come from bad high schools where the teaching of science was not good enough. Yet, we forget that what makes a good scientist is not so much what you know but how passionately you feel about learning. By not teaching them how science is really constructed, the message we are sending is that what you need is to memorize this or that, learn a technique, and only do one thing for the rest of your professional life. Bad mistake. We need to transmit to them the passion for science, the joy of scientific discovery and, more importantly, that outsiders are usually the ones making the big contributions to science: after all Darwin, the father of our current evolutionary thought, was trained as a geologist, not as a biologist; Mendel, the father of genetics, was trained in physics, not biology; Pasteur, one of the fathers of microbiology, kept reminding people that he was a chemist, not a biologist; that Wegener, who first gave an explanation about the origin of continents as we know them, was a climatologist, not a geologist. These lessons are more than historical curiosities, they teach that you do not need to be white to do well in a particular science, that it is fine to be an outsider.

Unfortunately, we are producing biology students that are essentially illiterate; yes, they memorized the Krebs cycle, but don't know who Krebs was, how he discovered what he did, and why that is important. Therefore, why should they bother?

If we ever want to attract and produce better students of any color, we need to infuse the enthusiasm and passion for science by teaching about the big picture. I wonder if in the current climate in which faculty earn promotion and tenure for doing one thing and one thing only, we have the appropriate human resources to accomplish that.