2. Problems of Black Physics Students and Programs to Solve Them

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(Abbreviated Text)

I want to thank Professor Mickens for giving me his time. He and I have discussed the paper at length and I believe that it will reflect his thoughts, as well as mine.

It is imperative that we be both analytical and prescriptive. We must do more than give a taxonomy of the problems, even though this taxonomy is needed. We must go beyond and give prescriptions that can solve the problems listed. We must advocate remedies.

In listing problems, I do not intend to denigrate at all existing Black institutions and their work. Remember that I have been totally committed to Black physics departments for more than five years.

Remember also that the productivity of the Black institutions in producing physics graduates is two orders of magnitudes higher than that of majority institutions--an average of 2 physicists per year per institution compared with 1 per 20 institutions per year for majority institutions.

Let me begin by listing problems the student faces in three time intervals, the high school-to-undergraduate interface, the undergraduate career, and the undergraduate-to-graduate interface and subsequent graduate career.

1. High School-to-Undergraduate Interface. This area must be considered because it determines the initial and boundary conditions for retention problems of the undergraduate years. Some of the problems in this area are:

(a) Poor high-school advising. Many advisers are overloaded with advisees. Many advisers are ignorant of existing educational opportunities. There are frequently patronizing attitudes toward capabilities and ambitions of students.

(b) Inadequate mathematics and science preparation. Many high-school curricula are weak in these areas and many of the teachers are poorly trained. Students are not well-advised in course selection. The stresses on a student in high school, particularly at the higher level, are against achievement. In particular, the peer group provides negative challenges.

(c) Inadequate or nonexistent recruiting efforts by college departments. There are very limited scholarships or other financial support available specifically for physics majors. Many recruiting efforts are limited geographically or hampered by traditional ideas of physics-major candidates.

2. Undergraduate Career. Some of the problems in this area are:

(a) Inadequate or ineffective contact with true science experiences. Many faculty members are critically overextended or are stale and not active in research. The involvement of students in research is limited. Conflicts with academic requirements make access to summer-job experience limited.

(b) Inadequate instruction and instructional programs. Laboratories are underequipped and underplanned, especially in specialized, advanced experiments (which is related to the absence of graduate students at most of these colleges). Most teachers are overloaded and have

inadequate preparation time or structured released time for course, lab, and curriculum planning. Many faculty members have also had to become national agents of affirmative action and to spend precious time investigating industrial and educational racism. The most able people are involved in many activities and are overextended. Finally, many departments have only old data on what graduate schools expect of students and the curriculum they offer is outdated.

(c) Financial stresses. Almost all students need to work, sometimes at more than one job, to meet their bills. There is a complete absence of department scholarships, controlled by those who know the students best. Department budgets as a whole are severely limited and contingent.

(d) Motivational stresses. For the students, there is a peer-group-induced de-emphasis on dedication to the "scientific life-style" and demands of other competing academic responsibilities, such as philosophy, religion, and foreign languages. The students also suffer from diverted faculty enthusiasm and energies

3. Undergraduate-to-Graduate Interface and Graduate Career. This is typically a time of transition from a minority to a majority school, often a prestigious one, and many problems arise:

(a) The burden of uniqueness. The minority student involuntarily represents his race and subject to the "only-one" syndrome, whether he accepts it or rejects it. It is difficult for him not to be involved in affirmative action, with all the time it requires. He frequently encounters racism in the garb of paternalism, even though one might have thought the level of sophistication was above this.

(b) Life-style collisions. There is the "Saturday-night" syndrome, a need for a change and regrouping after a hard week. There is also a need for a cultural reference for someone who is consciously black.

(c) Mentors in times of crisis. All of us have had times of crisis in our lives. The minority student needs an empathetic mentor to whom he can relate at such times. The mentor must be a successful role-model. The mentor must also be able to get detailed knowledge of the particulars of the situation and be able to champion the student. Most majority schools have no identifiable mentor.

(d) Advisement errors. When some undergraduates decide on physics as a career, they are brought to a high level of achievement by the individual attention of a faculty member. Can he go to a majority graduate school and continue to achieve without the presence of that faculty member? Is he weaned, mature, and ready for the buffeting of graduate school?

Another question is the traditional "theory vs. experimental" choice of paths for the student. There is a lot of detailed politics in any graduate department that is involved in this choice and it is difficult for the minority student to find out about this politics.

(e) Graduate-department unreadiness. Most majority departments have a complete absence of real-time monitoring. Students are allowed to act as free agents for two years before it is determined whether they were ready for graduate school through examinations. With all the diverting pressures, it is difficult for minority students to know what to stress in the absence of guideposts and they slide along instead of studying.

Many graduate departments are also not completely open to nontraditional behavior modalities. These modalities have no necessary correlation with the student's intellectual capability or motivation. Some of these modalities turn off faculty or even prejudice him against the student. These same problems exist at all levels of education. The educational system of this country has never been predicated on modalities that empower Black people in any discipline.

(f) Unsteadiness in doctoral-thesis mentor selection. There is a dilemma of committed money--whether a student is attached to a project that gives him a free ride or whether he comes with outside money. With outside money, the student is free of teaching or research responsibility, but at the same time, no one is committed to him and he is an appendage. The student has a difficult choice to make.

There are also many faculty people without a track record, so that it is difficult for the student to determine whether they will be good thesis mentors. This is also a problem for majority graduate students, but the minority student has many additional problems about the mentor's attitudes toward him.

This completes my summary of the problems affecting retention of minority students. I want now to make a number of prescriptive points:

This is a new day and a new kind of student. The traditional visions and trappings of physics majors are obsolete and, indeed, dysfunctional. Many of these students are very different, but brilliant, and the question is whether we can get beyond that.

These students are social creatures who need human contact for survival. They are also committed and concerned about what is going on in the world. They are political creatures involved in the struggle of Black people and knowledgeable in departmental maneuvering. They don't respond with a student-to-teacher deference. They challenge arbitrary decisions. Schools must learn a new vision of students.

The question of retention (and its inverse, attrition) is the fundamental question. It isn't that we can't find brilliant Black students. Do we have a process that allows them to effect the transition from entrance to exit at the end as a functioning, courageous, contributing professional? If the process is strongly dissipative, it doesn't matter how much money and how many students we put in. We will not be able to change the situation in other than trivial ways unless we change the character of the process.

Third, substantial undergraduate scholarships or fellowships under the control of physics departments at selected minority schools, who know where the needs are, are an absolute necessity. If we don't get funds to put into this educational help, we will be spinning our wheels and merely increasing entropy. The need is there and the problem is to convince the proper agencies that the need is imperative for them.

Fourth, the institutionalizing of the process of selecting one-to-one mentors must be considered. We need to find a selection process that will insure that a graduate student, especially in a majority college, will have a mentor in times of crisis. I want to be an advocate for the solution found by the Bell Labs program, where the mentor is outside the academic structure. The student works with him in the summer. The mentor champions him because he is committed by the bonds of the summer work and of the company interest.

Finally, we need to work to get funds for a national-scale "centers of excellence" program at a selected number of minority schools having track records of producing graduates who go on to graduate school in physics. We need to move in the direction the Sloan Foundation has for engineering. This money should go directly to physics departments. Some of the things this money can be used for are released time for planning, hiring of new faculty to bring departments up to the critical mass of faculty (approximately 5 fulltime people) at which they can begin to function in teaching, planning, and research, and discretionary funds to give some flexibility. These discretionary funds are needed for the small items that always come up outside the budget, such as extra physics-club activities.

In these ways, we could hope to inspire more of our students to become professional physicists.