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675 Wolf Ledges Parkway, Suite 2459 · Akron, Ohio 44309
Phone: (352) 682-2622 · e-mail: cee@che.ufl.edu

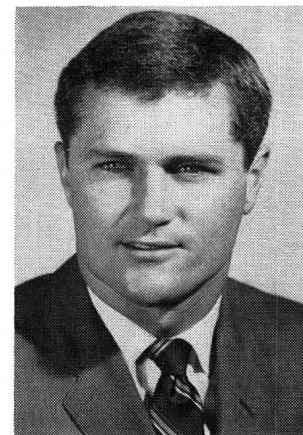
A Note to Readers:

Please be aware that some of the terminology used in this paper is outdated and may be considered inappropriate. *Chemical Engineering Education* recognizes that language is situated in time, and that terminology used in the past (e.g. words used to denote race), inferences, and situational roles, have changed during the journal's history. Additional context for this policy decision is outlined in the editorial "Diversity, Equity, and Inclusion: Language, Concepts, and Intent Mapped through History" (Minerick and Koretsky (2021) *CEE* 55(4): 190-191. DOI: 10.18260/2-1-370.660-128760). The paper has been left as originally published to maintain the historical record and this statement is added so we can continue to learn in the chemical engineering field. *CEE* staff and reviewers will utilize current discussions about language and race to make updates to style standards for new papers as appropriate.

CEE Staff
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ENGINEERING OPPORTUNITIES FOR NEGRO AND INDIAN YOUTH

BERT M. AVERY
The University of Oklahoma
Norman, Okla. 73069



Why should we in the College of Engineering be interested in the scientific development of Negro and Indian High School students?

The most obvious reason is that the minority groups represent an untapped source of students not only for engineering but for all the sciences. Surveys conducted by the engineering societies have indicated that the number of Negro and Indian engineers and scientists is far less than would be expected from either the size of the population or the number of college graduates. In other words, many of these students' capabilities are not being developed properly.

Secondly, as part of an institution of higher learning we should represent the more progressive element of our society; therefore, it is our responsibility to be at the forefront not only academically and professionally, but also socially. If one considers the minority groups' role in engineering and science, one should come to the conclusion that their future participation can do nothing but expand until they have filled the present vacuum. My question is "Why should we eat the dust of others already moving in this direction of progress?" "Why shouldn't we, and why can't we, lead the way in this area of human development?" Before I leave this stream of thought, I should like to point out that we are actually depriving our white engineering students of an opportunity of learning and understanding minority group people and their problems.

Dr. Hollomon, President of the University of Oklahoma, has told us several times that we should plan our programs to react to the needs of the state; that we should use our knowledge to help solve the human and social problems of our time; and that we must work together and be interested in the University as a whole. There are few better ways for us to work together as a college or university than to apply our knowl-

Bert M. Avery is Assistant Director of the School of Chemical Engineering and Materials Science at the University of Oklahoma. He holds BS and MS degrees in Chemical Engineering from OU. For several years he was associated with IBM as a systems engineer on Shell Oil Account in Houston, Texas, before assuming his present position at OU in 1968.

edge to upgrade minority group students in science and mathematics. In addition, no one can deny that a definite need of our state is to develop the potential of our minority groups so they are in a position to help themselves as well as the state in the forms of tax revenue, leadership, and racial harmony.

Helping educationally deprived students realize their educational capabilities is one way we can do our part to help relieve some of the racial strife in our nation.

At this point I would like to explain how the School of Chemical Engineering and Materials Science got so involved in this problem. In April of 1968 three things occurred concurrently.

- An AIChE task force report on career guidance was received that pointed out that the number of Negro engineers and scientist was very small. Also, there are two urgent reasons to interest Negro students in engineering: The general need for engineers, and the need to correct a social situation of national importance.

- Dr. Hollomon, then president designate of OU, talked to the entire engineering faculty and in that talk urged us to turn out knowledge and skills to solving social and human problems in this state and across America.

- An article by Zelbert Moore and Paul Galloway, "Those You Never Know", appeared in an edition of *The Sooner* magazine that was dedicated to the plight of the Negro student at the University of Oklahoma.

As a result of these three events I was prompted to ask during a CEMS faculty discussion of our high school recruiting program, "Why don't we recruit black students?"

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Utilizing the AIChE task force report, numerous discussions with NAACP, Urban League, Oklahomans for Indian Opportunity, Negro principals and high school teachers, faculty members of OU and UCLA, and fellow Black graduate students, I came up with three basic problems:

- Lack of knowledge on the part of minority group high school teachers and students of the opportunities available in engineering.
- Even if these opportunities were understood, the great majority of students have inadequate background in mathematics and science to pursue engineering studies.
- Improper motivation from the home of the student.

Believing that there is a great source of capable engineers and scientists within the Negro and Indian communities, we in Chemical Engineering and Materials Science sponsored an Engineering Conference "Engineering Opportunities for Negro and Indian Youth" for Oklahoma high school principals, superintendents, science teachers, and counselors on September 27 and 28 at the University of Oklahoma.

ENGINEERING CONFERENCE

The program that involved 30 high school people, Negro and Indian students, Engineering faculty members, and specialties in the field of Science Education was designed around one central objective. That objective was to determine as best we could the barriers that exist for Negro and Indian youth in terms of their progress toward science oriented careers and possibly determine some ways of cracking those barriers. The first part of the session was a series of speakers presenting information in a variety of areas from Federal Education Programs to innovative experiments being conducted at UCLA. The purpose of these presentations was to provide participants will as much current information as possible concerning all areas that involve educationally disadvantaged.

The second part of the session was the real heart of the program and would determine the success or failure of the Conference. The participants were divided into discussion groups consisting of three to four high school participants, one Negro or Indian student, one of the Confer-

ence speakers, and an OU faculty member. These groups, under the direction of Engineering faculty members, utilized the knowledge acquired in the first part of the session and their own experiences to determine possible solutions to the following problems:

1. How to best communicate to students the opportunities in engineering?
2. How to determine which students are qualified for a career in engineering?
3. How the University may help to better prepare the student for engineering study?
4. The need for a relationship between the student and the University community.
5. The difficulty of freshman curriculum.

These along with many other problems were discussed and as a result we hope to obtain enough information to allow us to implement some constructive practical programs that will work over a long period of time.

CONFERENCE RESULTS

We are presently analyzing the various ideas generated by the Conference and therefore are not in a position to justify the rightness or the wrongness of the following suggestions.

HOW TO BEST COMMUNICATE TO STUDENTS THE OPPORTUNITIES IN ENGINEERING ?

- There should be high school visitations by engineering faculty members and whenever possible they should be accompanied by an engineering student who belongs to the same ethnic group as the high school students.
- A film should be made that would show the Negro and Indian engineering student in various classroom, laboratory, and social activities. The film should be one the student could identify with and say to himself, "If that student can do it, so can I."
- A summer program designed to acquaint the high-school science teachers with engineering. Also, introduce introductory courses in engineering at high school level which might be taught by engineers from industry or the university.
- Industry and government should implement programs for high school teachers and students that would give them a first hand look at engineering.
- All of these programs should start with seventh and eighth graders, and because of the generally low economic status of the minority groups, the financial or materialistic rewards should be emphasized; however, the professional status and pride of accomplishment should not be overlooked.

There are few better ways for us to work together . . . than to apply our knowledge to upgrade minority group students in science and mathematics . . .

● Finally, we need a method of demonstrating or giving evidence to Negro and Indian students that jobs and opportunities really do exist within industry.

HOW TO DETERMINE WHICH STUDENTS ARE QUALIFIED FOR A CAREER IN ENGINEERING ?

● We must curtail the "creaming" process of applying a selectivity procedure for admission to the University that eliminates 90% of the Negro and Indian students. This involves tests that measure white middle class values, inadequate counseling, and so on. The ACT should be reexamined to determine its validity for deprived groups. Special counseling and guidance is needed.

HOW THE UNIVERSITY MAY HELP TO BETTER PREPARE THE STUDENT FOR ENGINEERING STUDIES ?

● Coordinate and conduct summer sessions involving the best mathematics and science educators throughout the state and bring them together with the students who have had low quality instruction in these areas. This should occur every summer from the seventh grade through college. Because many of these students must work in the summer to put clothes on their backs we must not only pay all expenses but also reimburse them for the money they would have made had they worked instead of attending the summer session.

● Send university students into high schools as junior counselors. In many cases, the educationally disadvantaged student may communicate better with a college student nearer his age and with his same cultural background.

● There must be a university commitment on the part of the president, deans, and faculty members to support specialized programs.

a) Reserve 10% of admissions for students that cannot meet the usual requirements.

b) These students should have special counseling and programs such as a year pre-engineering on a pass-fail basis.

c) Tuition should be cancelled for any student from a family that makes less than \$5,000 a year.

d) Scholarships that would provide full support for all undergraduate years. The Negro and Indian student is often affected by problems and situations that white students take in stride. The additional burden of supporting themselves is more than most students can handle.

e) Support of minority group instructors and graduate assistants. We can't afford to apply the usual criteria used for hiring faculty. Instead, we must ask the question "can they do the job that needs to be done?"

f) Establish science centers about the state where students and secondary school teachers could come for help and additional training. These could be manned by graduate assistants, part time instructors, interested faculty.

THE NEED FOR A RELATIONSHIP BETWEEN THE STUDENT AND THE UNIVERSITY COMMUNITY.

● There is a genuine feeling among the non-white students that the university system is geared to the white-student, his background, his social elevation, his values. The non-white are treated uniformly the same, but not equally.

● We need more representation of non-whites in administrative and faculty positions. Faculty needs to be more tolerant and understanding concerning cultural differences. We need an environment that supports and encourages students in their endeavor to establish values that are best for them.

● A "social awareness" program should be implemented in Engineering colleges. This would be an effort to involve students and faculty in social programs in the community.

DIFFICULTY OF FRESHMAN CURRICULUM.

● An effective system of tutorial instruction would not only aid the new student in course work, but might create a feeling of belonging. The tutorial sessions must be taken to the student in his dorm or places of residence. This might be a very worth while project for the various engineering clubs.

● Specialized counseling by concerned individuals is a must.

In general we concluded, for any program that proposes to work and produce practical results we must have from those involved an intense interest and an almost zealous commitment. We must not be overly skeptical of new and traditionally unacceptable modes of operation. We must be willing to accept the challenge of supporting broad comprehensive programs which may involve and affect all areas of university life. We must develop the flexibility to accept the different cultural values possessed by the non-white students.

Any programs that are proposed should at least include the following:

- 1) Emphasis on the dignity of the individual.
- 2) Produce massive system changes.
- 3) Have built in incentives and guarantees for the young people who would participate.
- 4) Must include all educationally disadvantaged—Red, Black, White, Brown, Yellow and combinations thereof.

I think we in Chemical Engineering and Materials Science at the University of Oklahoma have made the commitment. Will you not join us?