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A PARTNERSHIP: THE SCHOOLING OF THE TEACHER

Ernest L. Boyer  
President

The Carnegie Foundation  
for the Advancement of Teaching

A National Conference of Chief State School Officers  
and College and University Presidents  
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### Introduction

This national conference that brings together chief school officers from almost every state, plus the national leadership in higher education, is one of the most significant events in recent education history. I commend Bartlett Giamatti president of Yale University, Calvin Frazier, superintendent of schools in the state of Colorado and Jack Sawyer of The Andrew W. Mellon Foundation, for their leadership and vision.

In preparing for this conference, The Carnegie Foundation for the Advancement of Teaching asked Gene Maeroff of the New York Times to find out what was going on between colleges and schools.

Gene's report, which we are releasing here today, suggests that the barriers between secondary and higher education are breaking down and that school/college collaboration is beginning to mean something more than tea and cookies in the afternoon. Indeed, a major new movement is taking place in American education.

For the first time since Sputnik, education leaders are joining together to clarify requirements for college entrance, to more aggressively encourage new kinds of transition arrangements and to share more widely faculty and facilities, as well. Excellence has, once again, become a common agenda for the nation's colleges and schools.

It is especially significant that excellence in teaching has been chosen as the focus of this conference.

As most of you know, the Carnegie Foundation is conducting a study of the American high school. We have spent over 2,000 hours in schools from coast to coast and one issue is absolutely clear. The quality of education in this nation is inextricably tied to the quality of teaching.

It is also clear, however, that today the teaching profession is imperiled -- rewards are few, moral is low, the best teachers are bailing out and the supply of good instructors is drying up.

This teaching crisis is most dramatically revealed in science and mathematics.

- o Since 1972, the number of math teachers emerging from college training programs has fallen 79 percent. In science, there has been a drop of 64 percent.<sup>1</sup>
- o In 1982, 32,000 classes in science and mathematics which were planned and needed -- involving 640,000 students -- could not be scheduled for lack of teachers and resources.<sup>2</sup>

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<sup>1</sup> National Science Teachers' Association. Study conducted by James A. Shymansky, The University of Iowa 1982.

<sup>2</sup> Testimony before the subcommittee on Elementary and Secondary Education, United States House of Representatives by

- o Equally serious is the fact that, in 1981, half of all newly employed science and mathematics teachers in 1981 were underqualified to teach these basic subjects.<sup>3</sup>
  
- o The Florida Department of Education estimates that, for the next five years, its colleges and universities will graduate only 20 math teachers a year -- this in spite of an annual need for 325 such teachers in schools across the state.
  
- o Of 1,444 Los Angeles teachers -- grades 7-12 -- who have at least one period of math daily, 32 percent have neither a collegiate major nor minor in mathematics.
  
- o In 1982, New York State had only 32 college graduates who planned to teach math in junior or senior high school among some 80,000 who graduated.
  
- o And, these are not isolated instances. In fact, in 1981, a total of 43 states reported a shortage of teachers in science and mathematics.

Robert E. Yager, president, National Science Teachers Association.

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<sup>3</sup> Educational Leadership, November 1982, James A. Shymansky, Bill G. Aldridge, pp. 60-6.

-4-

I

What should be the national response to this crisis that will have enormous impact on the economic future and on the national security of the nation?

Last month, in his State of the Union message, President Reagan said that if the United States hopes to keep its edge as world leader we must renew our education system.

- o The President then proposed a \$70 million "catch up" program for math and science teachers.
- o And the core of the proposal is a \$50 million block grant program to retrain -- for math and science -- unemployed, retired and new teachers.

I do not wish to diminish the significance of the government's initiative. But I do wonder if we understand the seriousness of the problem we confront.

We cannot delude the nation into believing that rebuilding public education will call for less commitment than rebuilding roads and bridges or rebuilding the security of the nation. And yet, the 1984 Federal budget calls for a six percent reduction in education, overall, while proposing a \$30 billion increase in national defense.

-5-

Strengthening America's education system is, in my view, a national problem and -- at selected points -- calls for a national response. Still, I was in government long enough to know that Washington can not and should not do the job alone.

Rather, action at all levels is now needed. And, in particular, a new school/college partnership is required -- one that involves the collaborative leadership of the institutions in this room.

Therefore -- in the remaining time -- I should like to focus on excellence in teaching, examining specifically science and mathematics which dramatizes the problem we confront.

I should also like to highlight the possibilities of increased collaboration between colleges and schools.

## II

First, to strengthen secondary education teaching means improving education long before students arrive at the high school door.

It is inadequate for educators to talk about recruiting high school math and science teachers if, in the early grades, students have not been taught the problem-solving skills on which math and science scholarship depends.

- o Today, in the United States, elementary school children spend only about 3 3/4 hours on arithmetic every week -- and only about 1 1/2 hours on science.<sup>4</sup>
- o And the latest National Assessment of Educational Progress reveals that, during the 1970's, the science performance of "high achieving" students actually dropped -- dropped 2.4 percent for 4th grade, 4.1 percent for 8th grade, and 4.2 percent for 11th grade. The reason suggested was inadequate science teaching in the early grades.

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<sup>4</sup> Science and Mathematics in the School: Report of a Convocation, National Academy of Sciences, p. 4.

Clearly, excellence in science and mathematics -- or in any other subject -- means that a solid academic foundation should be laid for every student in the first years of formal education.

- o If this foundation is not in place, students will be chronically behind.
- o High school teachers will be forced to spend their time on remedial education and, in frustration, they will leave.
- o And, of course, colleges will continue to be caught in an unending program of remediation.

Given the importance of the early years, I suggest that a more appropriate response to the math-science crisis might be a major increase in Title I support plus, perhaps, collaboration between colleges and schools to develop a science and mathematics proficiency examination to make sure students in the early grades have mastered basic skills.

Perhaps we also need school-college cooperation to identify, more successfully, young students who are gifted in these special fields. Guilford College offers an educational program called "A Month of Sundays". Invitations are extended by the college through local schools for parents to bring their elementary school daughters and sons to a series of introductory courses taught on Sunday afternoons by Guilford faculty.



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-8-

The cost of the connection between schools and this college are nominal, the benefits for precocious children as well as their parents are considerable, the modest financial supplement for the faculty is appreciated, and the potential benefits for the nation are immense.

III

Second, to strengthen teaching -- especially in high school math and science -- two very different curriculum and teaching strategies are required.

At one level, we must have a solid general education program for every student in every one of the 20,000 high schools in the nation. This means a core of basic courses to give all students the skills and knowledge needed to understand and to live effectively in a technologically complicated, interdependent world. To teach successfully in such a program calls for a special vision and special skills as well.

Once again, however, this is not a job for the schools alone.

- o Higher education leaders talk a lot about how general education standards have fallen in the schools. And yet, the harsh truth is that colleges themselves are at least partly responsible for this decline.
- o During the past two decades, college admission standards were abandoned at many institutions and graduation requirements were reduced.
- o If colleges expect high schools to develop a core program of general education, then they themselves

-10-

must decide what it means to be an educated person.  
And the quality of college teaching must improve.

- o And, college professors all too often failed to provide the information and inspiration on which a good general education program must be based.

Indeed, in the spirit of this conference, is it too utopian to suggest that one of the ways to assure a vital partnership is for teachers from colleges and schools to explore together the goals of educators and to work collaboratively to shape a general education sequence for all students.

But a second curriculum and teaching strategy is needed.

In addition to the general education core for every student, schools and colleges also must provide special opportunities for those students -- five-ten-fifteen percent perhaps -- who have a special aptitude in science and mathematics, those who will become the scholars and pioneer in basic and applied research.

- o Three years ago, the state of North Carolina established a residential school in science and mathematics. This institution -- serving several hundred outstanding students from all across the state -- not only provides a basic education but also offers advanced study in math and science.

-11-

- o Gifted, well-trained teachers have been recruited and the university is involved, as well, making it possible for high school students to begin to work with scholars in the field.

The point is this: It will be impossible for every high school to provide the top teachers and the sophisticated equipment needed to offer advanced study for talented math and science students.

Therefore, I suggest the establishment of a network of residential academies all across the nation.

- o Some may be within a densely populated district.
- o Others may serve a single state.
- o And, in less densely populated areas, a school may serve several states.
- o Also, some of these academies might be located on a college campus.

Regardless of sponsorship or location, a network of academies should be collaboratively developed by schools and colleges in every state and region and such schools should receive some federal support since, clearly, the vital interests of the nation are at stake.

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-12-

One further point. While the emphasis here is on science and mathematics, the need for early identification of gifted students and for continuous, high quality, instruction also applies to selected other fields -- especially foreign languages and the arts. Academies may be needed to serve these equally important specialties as well.

IV

This brings me back to teachers.

If we want outstanding instructors in science and mathematics -- or in any other discipline -- recruiting must begin early, it must be sustained, and both schools and colleges must be aggressively involved.

- o The Houston School District has a magnet school for prospective teachers -- a place where high school students interested in teaching as a career, can get a "feel" for the profession and begin to specialize somewhat.
- o While all students at the magnet school complete a solid academic program, they also do classroom observation and have the opportunity to work with outstanding professors from local higher learning institutions and other teachers too.

Another point. Schools and colleges also may collaboratively sponsor a summer "prospective teacher" program for gifted high school students.

- o Under such a program, high school instructors would select several of their ablest students who show an aptitude to teach.

- o Such students would receive a scholarship to spend a summer term with an outstanding school teacher and college professor who serve as mentors, not only in the discipline of interest, but in the skills of teaching, too.
  
- o If a pool of such students were selected early and encouraged, teaching prospects for the future would be enormously enhanced.

Further, these promising high school students may well be candidates for teacher scholarships once they apply for college.

But to be successful, the climate on the campus must begin to change.

There is at many higher learning institutions a shocking bias against teaching in the public schools.

We, at the Carnegie Foundation, met one student at an Ivy League Institution who made the problem vividly apparent. He said,

We (who select teaching) at this university are under enormous pressure to justify our choice. (Faculty) try to direct us in other ways. And, of course, most of the other students think we are crazy...

There is, quite frankly, a lot of hypocrisy at work when colleges call for "excellence in the school" while spending several hundred million dollars every year recruiting athletes and spending virtually no time or money recruiting teachers.

- o To correct this curious imbalance, the nation's colleges and universities should consider giving full tuition scholarships to the top 5 or 10 or 15 percent of their gifted students who plan to teach in public education. Identifying such students is possible, I suggest, only if schools and colleges agree to work together to promote teaching and to mount recruitment programs such as those described.

If higher education leaders wish to be part of the solution -- rather than the problem -- they must speak with conviction about the significance and the dignity of teaching in the public schools.



Excellence in teaching also means teachers must have adequate supplies and support to do their work.

- o Today, only about one percent of the public school budget is used for textbooks, teaching equipment and supplies.
- o And a survey of 450 science teachers revealed that -- in 1981 -- 60 percent of the schools were cutting still further their equipment and supplies budget in laboratory science.

While conducting school visits for the Carnegie high school report, we met one science teacher at a large urban high school who talked of his despair. He said:

"When I entered through the door of this classroom for the first time, I was as depressed as I was when getting on the plane to Vietnam. The doors on the cupboards and workbenches were torn off. The equipment was broken, and when I went to the back storage room for the chemicals it was even more depressing.

"....I have little money for equipment, no accelerator timer, the pulleys are broken, there are few experiments where all the necessary equipment works."

This picture is perhaps too gloomy.

More typical may be the story of Ben Eichelberger who -- in a middle income district -- left science teaching because of a feeling of being trapped. He said:

I have five classes and four different preparations. During one week I had to collect tickets at the basketball game. I had to beg for everything -- even equipment for experiments -- because I didn't have a budget.

Ben Eichelberger will earn about \$30,000 this year as an electrician.

We conclude that school boards -- and the community at large -- should understand that schools must have adequate budgets to provide students and teachers the tools they need to do the job.

Here again, higher education has a role to play.

-18-

- o Colleges can make laboratory equipment available -- on loan -- to a science teacher in the schools.
  
- o College labs can be used occasionally by high school students and their teachers.
  
- o College science professors can collaborate with school science teachers to complete an inventory of what the school lab requires.
  
- o And college officials can testify before school boards to urge more adequate support.

Incidentally, just this week I received a call from a executive at Monsanto who told of a program of bringing their own scientists as special lecturers into selected public schools in St. Louis. He also spoke of the prospect of making available surplus, but up-to-date lab equipment needed by the schools. Exploring possibilities such as this may be precisely what colleges and schools in a given region can do together.

## VI

Further, to achieve excellence in teaching, schools and colleges should work together to provide, for teachers, more recognitions and rewards.

While it will not be possible fully to close the gap between teaching salaries and salaries in the corporate world, ways must be found to improve the tangible and intangible benefits of teaching.

Today, it is especially disturbing that good teachers are not financially rewarded for their work. The notion seems to be that if you're good you will move out of teaching and become a counselor or administrator -- or a football coach.

Good teachers must be recognized and moved forward within the profession, not outside it. Consider the possibility of having special ranks -- senior teacher or master teacher -- to reward good instructors and help beginning teachers, too.

Again, colleges and the corporate world have an important role to play.

In the future, some school faculty may have joint appointments with industry and business or with a higher learning institution. And, on another level, special recognitions can be given.

- o Princeton University for example, honors, every year, the five outstanding teachers in New Jersey.
  
- o At Georgetown, and at other higher learning institutions an honorary degree is awarded to an outstanding teacher in the schools.
  
- o Some colleges cite alumni who have had a distinguished career in teaching.

Clearly, every college and university in the nation should, in some fashion, systematically recognize excellence in teaching in the nation's public schools.

## VII

Finally, secondary and higher education should work together to promote the continued schooling of the teachers.

A 1981 survey revealed that 79 percent of the science teachers had not completed a ten hour course or workshop in the last 10 years.

And 40 percent reported never having attended an inservice course or workshop since they began teaching -- an average of 15 years!<sup>5</sup>

- o In contrast, Japan, in 1960, set up special Science Education Centers in all of the nation's 46 prefectures -- offering tuition-free programs to teachers to learn about the latest developments in science.
- o These centers have since broadened to include all school subjects and, ironically, much of the teaching material used is imported from the United States.

In President Reagan's 1984 Budget there is -- in addition to the \$50 million scholarship program -- a \$19 million program to enrich math and science teaching.

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<sup>5</sup> Shymansky and Aldridge, Educational Leadership, November, 1982

The focus of this program is appropriate -- but, frankly, the ground rules are disturbing.

The proposed grants are to be given, not to schools, but to higher learning institutions. Why is it that whenever we want to improve teaching in the school, we give the money to professors in the college?

- o I believe the proposed grants in this federal initiative should support joint school-college projects.
- o Principals and teachers should be given the opportunity to help shape continuing education programs, rather than wait for colleges -- unilaterally -- to decide what schools do and do not need.

Incidentally, in the 1984 education budget -- which it now appears congress will expand -- the administration is also asking for one million dollars for awards to outstanding teachers in science and mathematics. This program, while smallest in the proposed new program, may in the long run, be the most significant of all.

When we begin to honor excellence in the classroom then, I believe, the effective recruitment of good teachers can begin again.

### Conclusion

And now I return to the point where I began.

Collaboration between colleges and schools is an important and growing movement in the nation.

Clearly, such a partnership will advance excellence in teaching and -- through the cooperative schooling of teachers -- help relieve the current crisis in science and mathematics.

But the potential for such cooperation can be no greater than our ability to agree on common goals.

- o Efforts to improve cooperation will be unproductive so long as the objectives of the eight years of the high school and college remain unclear.
- o Experiments will come and go. Projects will die. New ones will be born. But no sense of continuity will emerge.

Collaboration is, after all, a means to a larger, more essential end.

- o Partnerships will take root only as schools and colleges have a shared vision and a common understanding as to where they should be going.



I am convinced that as schools and colleges work together:

- o to strengthen early education;
- o define the academic core;
- o promote the gifted;
- o recruit, for teaching, outstanding students, and
- o give teachers adequate tools and appropriate recognition,

then, the theme of this conference -- excellence in teaching -- becomes an achievable objective.

For those who make the effort, the rewards are high and students are well served.

There can be no better reason for colleges and schools to work together.

Where Can Certified Preschool Teachers Teach? Preschool Teacher Organizations & Associations. What is the Salary of a Preschool Teacher? Featured programs. Sponsored listings. Preschool is one of the only environments in school where the focus is on play and creativity, rather than intense curricular standards. Preschool teachers use playtime and story time to teach problem-solving skills, encourage social development, and hone fine motor skills. Qualities of a Preschool Teacher. Work in partnership with families to help preschoolers attain proficiency with life skills like getting dressed, using the toilet, and eating. Conduct all work activities in a timely and professional manner reflecting best educational practices.