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POLYMER SCIENCE AT THE UNIVERSITY OF MASSACHUSETTS

M. Appley
Dean, Graduate School
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It gives me great pleasure to have this opportunity to welcome you to the Amherst campus of the University of Massachusetts. The Graduate School and its Polymer Science and Engineering Program are honored to host this International Colloquium of so distinguished a group of scientists.

Perhaps it would be in order to tell you a few things about our University. While I am sure you are aware of the long and distinguished tradition in higher education in Massachusetts, this reputation for excellence was associated with private rather than public institutions. Students from all over the world came to study with the distinguished faculties at Harvard, MIT, Tufts, Boston College, Boston University, and other of the private colleges and universities. With these fine institutions available, the efforts in public education were generally concentrated in agriculture and the training of teachers.

What is now the University of Massachusetts was begun on this site over 100 years ago as a small agricultural school under the Morrill Land Grant Act. Not until after World War II did it assume university status and only in this past decade was the decision made to encourage the growth of a major center of excellence in higher learning in the public sector.

As a public university, we derive our support from State appropriations, tuition and fees, and research and training grants from largely Federal sources. The Commonwealth of Massachusetts has been extremely generous in this past decade in providing the wherewithal for extraordinary growth of the University. Not only has this campus been dramatically enlarged and upgraded, but the University has under construction a major campus in the Boston area and a third campus in Worcester where a fledgling medical school is now in operation. Additional units of the University include experimental stations for agriculture, radio astronomy, and marine sciences.

The University, then, is in a sense, over 100 years old. In another sense, it is less than ten years old. Fifty per cent of the present faculty have come to the University within the past six years. These, combined with some fine older faculty members, provide us with what we consider to be an excellent faculty base on which to build a great university.

As you look around the campus, you will see new buildings both recently occupied and under construction. We hope that you will have a chance to look at the new quarters that the Polymer Science and Engineering group and the Polymer Research Institute will occupy in the Graduate Research Center. This complex will also house the Departments of Chemistry and Biochemistry, the University Computing Center, the Graduate School offices, and a number of allied activities, including a Physical Sciences Library and a group of research-support facilities (e.g., glass blowing, instrument, electronics, and chemical analysis shops).

Nearly completed also is a twenty-eight story central library for the campus which will enable further growth of our library collection which is now just over one million volumes. Across the pond to the south is the new Fine Arts complex which, when completed, will provide some of the finest facilities for the performing arts to be found in New England.

We expect shortly to begin construction on two additional towers for the Graduate Research Center to contain Mathematics and Physics programs, among others. By 1975, or shortly thereafter, the major construction of this campus will be completed and about this time we should reach full growth to approximately fifteen hundred faculty and twenty-five thousand students.

The Polymer Research Institute was proposed by Professor Stein and chartered by the Board of Trustees of the University in 1961 to coordinate and stimulate research and education in polymer science at the University. Through its efforts, appreciable support for research through government and industrial grants and contracts was secured, and a number of polymer courses within the Chemistry Department were organized. This justified the addition of staff members in Chemistry (Professor MacKnight) and in Chemical Engineering (Professor Lenz). A plan for the Polymer Science and Engineering program, on an interdisciplinary educational basis, was formulated and approved by the University in 1966 with the selection of Professor Porter, a rheologist, as its Head. Rapid growth followed with the appointment of Professors Karasz (thermodynamics) and Price (morphology) in the Program, Chien (physical chemistry) in Chemistry and

Middleman (rheology) and Laurence (reactor design) in Chemical Engineering. The interests of the faculty members were initially oriented toward physics and physical chemistry of polymers. Our recent attempts were to have a well-balanced Program in Polymer Science including synthetic polymer chemistry, characterization, morphology, and solid state properties of polymers and the aspects of polymer engineering.

As a consequence, we appointed Professor Vogl in 1970, today's Conference Chairman, to take care of our teaching and research needs in Synthetic Polymer Chemistry.

The number of students studying for graduate degrees are more than 50, and 20 post-doctoral fellows are conducting research in the Program. We look forward to the opening of the facilities in the Graduate Research Center which will permit the consolidation of the efforts of these groups.

If I am interpreting my role correctly, I am supposed to present a few irrelevant facts in these introductory remarks before you get down to the serious business of the meetings. Let me, then, say a word about the Campus Center in which we are meeting. This building, as you may not know, is not the property of the University of Massachusetts. It is owned by the students--or, more correctly, by the students and the bond holders. It has been open for just under a year. Its initial and continuing support comes from student self-taxing and such fees as are collected from its operation. The Center serves both the students and conference activities and provides a unique opportunity for visitors to come into casual contact with both undergraduate and graduate students. If you have wandered through the lower floors of the building, you will un-

doubtedly have run into some strange-looking people. Let me explain, particularly for the visitors from abroad, that these strange-looking people are our students. I have not been abroad for several years and do not, therefore, know what campuses in other countries are like these days. But in the United States, students have undergone a kind of physical metamorphosis. While in a previous era students tended to conform one to the next in appearance and manner, what now seems to be happening is an emphasis on individuality and difference. This is visible in the ways in which hair is worn, both on the head and on the cheeks, and in their unusual and highly individualistic dress. Alas, the outsider may not be able to distinguish the sometimes subtle differences in appearance among the individuals involved. When viewed from enough social-psychological distance, "they all look alike".

In my view, and I have taught at a variety of American and Canadian institutions for some twenty-five years, I find the students of today both disturbingly different and, at the same time, considerably more challenging--if at the same time more frustrating--than at any time before. There is in their rhetoric as well as in their dress and manner an intentional offensiveness. But it behooves us to look below the surface for the message that is there. There is a message. They are, indeed, trying to say something about and to the adult society. They are raising serious questions, albeit awkwardly, about the way we are running or not running society, about the blatant inconsistencies in our values and about our apparent unwillingness or inability to "put it all together". We should not be surprised at the poor way that this communication is taking place because, indeed, they

are asking complex questions about complex and subtle issues to which most of us, committed and involved as we are, have paid insufficient attention. My point is simply that we must not reject the message because of the way it is packaged. The quest is, indeed, a serious one and one that could and should engage us. If universities are more than conglomerates or federations of specialist groups, they must engage the broad value questions of the society as part of their intellectual endeavors regardless of their involvement in their special areas of focus or interest.

The graduate schools of this country have been rapidly expanding. This process has consumed us to the point where we had little time to develop awareness of the impact of our own activities. We are now being told, for example, that we are probably overproducing Ph.D's. Although not an immediate problem in such areas as the Polymer field, the market message is one that must now be part of our overall University plans. I submit that the student message has something for us, as well. What I see the students as saying is that we have allowed our own inward-looking, narrow interests to carry us forward in the pursuit of our own activities without regard to external or larger concerns.

I see the students raising three kinds of issues: They question the ethics of what we do. In the United States, at least, they challenge the role of the university in relation to the so-called military-industrial complex and ask us to examine the extent to which the university has become a witting or unwitting partner in activities that are beyond its control. They raise questions about our use or misuse of the environment--the extent to which we are pushing forward with narrow objectives,

ignoring the implications and the consequences of the things we do. And, thirdly, they are asking questions about the relationship of science and technology to society--questions which probably cannot be answered within the confines of the disciplines into which we have locked much or all of higher education.

I should make clear that I am by no means endorsing the sometimes extreme and oftentimes anti-intellectual aspects of the student movement. There are highly destructive elements in the "know nothing" approach. For some who have restricted future time perspective, this is a dangerous game that is being played. The more serious message, and the one I do commend to your attention, is the one that asks if we have been considering the larger issues and if we have been looking to the right variables. I hope that we can distinguish the important signals from the noise.

You are aware, I am sure, of the financial hard times that are being visited upon the universities these days. They are causing us for the first time in decades, to more carefully examine priorities, to improve our processes, and to re-address the kind of product and the kinds of purposes to which we dedicate our efforts. I hope that, in the process of responding to both external and internal pressures, we can take proper account of the kinds of issues the students have painfully brought to our attention.

I hope your meetings are successful.