DOCUMENT RESUME

ED 355 853 HE 026 287

AUTHOR Lawrence, Francis L.
TITLE Research and Graduate Education at Rutgers: A Distinguished Past, a Challenging Future.
INSTITUTION Rutgers, The State Univ., New Brunswick, N.J.
PUB DATE 30 Sep 92
NOTE 40p.
PUB TYPE Reports - General (140)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Accountability; *Educational Quality; *Graduate Study; Higher Education; *Institutional Administration; *Mission Statements; *Organizational Objectives; Postsecondary Education; *Problem Solving; Research Universities; Student Financial Aid; Undergraduate Students
IDENTIFIERS *Rutgers the State University NJ

ABSTRACT

This report provides Rutgers University's policy regarding its commitment to research and graduate education. Briefly examined are some external developments requiring imaginative and aggressive responses on the part of the university so that the school can maintain its position among the top echelon of research universities in the United States. Finally offered are some ideas for initiatives that will enable the school to continue to develop and maintain excellence in graduate education and research. Among the challenges identified and their inherent goals are: (1) using a state bond issue to restore funding for libraries, facilities, and equipment; (2) exploring the possibility of fundraising with the Foundation in order to increase graduate student financial support; (3) using undergraduate students to balance research and graduate education with undergraduate education; (4) devising structured programs of several years' duration to improve the professional training of the graduate students as teachers; and (5) continuing accountability procedures (financial audits, external program reviews, athletic oversight activities, etc.) to remedy declining public trust in higher education. (GLR)

Research and Graduate Education at Rutgers: A Distinguished Past, a Challenging Future

Francis L. Lawrence

September 30, 1992

Research and Graduate Education at Rutgers:

A Distinguished Past, a Challenging Future

Francis L. Lawrence

September 30, 1992

RESEARCH AND GRADUATE EDUCATION AT RUTGERS: A SUMMARY OUTLINE OF THE REPORT

The graduate education and research report makes several important statements of policy.

I. A mission statement:

A first rate graduate education and research program is essential at Rutgers to:

- advance knowledge through basic research;
- strengthen teaching at both the undergraduate and graduate levels through the discovery and transmission of cutting-edge knowledge by research-active teachers;
- educate the next generation of teacher-scholars;
- meet our responsibility as a state university to offer high quality graduate education in the arts and sciences and graduate professional training;
- carry out research and make experts available for the solution of problems of direct concern to New Jersey and the nation.

II. A statement backed by solid proof that Rutgers' rise to eminence as a major research university has not only been rapid and dramatic throughout the 1980s but has continued and gained momentum in the 1990s, despite the fiscal problems of the national recession. Our collective research funding has continued to rise and our faculty have won national awards of distinction.

III. A statement of our challenges for the future and our goals to meet those challenges:

- Our top priority is to restore funding of faculty lines. It heads our budget requests.
- Strategic planning by the provosts, with the assistance of CSPAD, will address the need to set priorities and shift funding from lower to higher priority areas.
- To restore funding for libraries, facilities and equipment, a state bond issue has been proposed. We are helping to lay the groundwork for it.
- To increase our inadequate graduate student financial support, the graduate school deans will explore the possibility of fundraising with the Foundation. I have already dedicated a gift of $800K as an endowment for graduate student support. I have approved a fourth cohort of Rutgers Graduate School Fellowships. I am asking our graduate deans to continue their special efforts to increase minority graduate students. To accomplish this, I suggest the formation of special relationships with some of the excellent historically black colleges and universities such as Howard and Xavier.

- To improve the professional training of our graduate students as teachers, as well as researchers, I challenge our departments to devise structured programs of several years' duration.

- To balance research and graduate education with undergraduate education, we are trying to involve as many of our excellent undergraduate students as possible in research. I am also suggesting an experimental program that would offer tenured faculty members in certain departments the opportunity to switch the balance of their effort toward more teaching and service through a more flexible, individually tailored workload.

- To remedy declining public trust in higher education, I have asserted that we must continue to follow our many administrative/academic accountability procedures (financial audits, external program reviews, athletic oversight activities, etc.). I have also suggested that we continue and expand the efforts recently begun in New Brunswick to train graduate students to be ethical professionals.

- In conclusion, I called Rutgers' rise to prominence one of the real Horatio Alger stories of American higher education and asserted that with commitment, hard work, and vision, we can become an even better and more distinguished university.

RESEARCH AND GRADUATE EDUCATION AT RUTGERS: A DISTINGUISHED PAST, A CHALLENGING FUTURE

In 1994, Rutgers, The State University of New Jersey will host an international conference celebrating the 50th anniversary of one of the most important scientific discoveries of all time, the drug streptomycin. Discovered at Rutgers in 1944 by the late Selman Waksman, streptomycin has been one of the most valuable weapons against disease ever employed by the world medical community and serves as an outstanding example of the vital role that American research universities play in the advancement of knowledge for the improvement of the human condition. Rutgers University is proud to have made this enduring contribution to scientific advancement. We look forward with excitement to hosting the conference that will commemorate this outstanding achievement.

This occasion obviously will be valuable in its own right, since scholars will use the opportunity to come together and share new knowledge as well as remember past achievements. But I would like to use the forthcoming occasion for an additional important purpose, as a time to reflect on both Rutgers' past and future as New Jersey's public research university. Shortly after I came to Rutgers in the fall of 1990, I issued a statement that, among other things, indicated strong support for the many ways that Rutgers has provided valuable service to New Jersey.[1] Last fall I prepared a similar policy statement in which I reviewed our obligation to provide quality undergraduate education to New Jersey's citizens.[2] Now, prompted by the forthcoming 50th anniversary of the discovery of

streptomycin, I would like to reaffirm Rutgers' commitment to the importance of its mission of research and graduate education. I will also briefly examine some external developments that require imaginative and aggressive responses on the part of the university so that we can continue our upward movement into the top echelon of research universities in the United States. Finally, I will offer some ideas for initiatives that will enable us to maintain the momentum we have developed and keep us on the path of excellence in graduate education and research.

The Importance of the Research and Graduate Education Missions at Rutgers, The State University of New Jersey

Graduate education and research have long and distinguished histories at Rutgers. According to Richard P. McCormick's Rutgers: A Bicentennial History, graduate courses were first offered by Rutgers College in 1876, and the first Ph.D. was awarded in 1884.[3] The Graduate School-New Brunswick was established in 1952 and was followed by the Graduate School-Newark in 1974 and the Graduate School-Camden in 1981.

As early as 1921 attention was given to the importance of research at the university when a faculty committee noted, with words that are just as convincing today, that "The function of an institution of learning is equally to conserve the acquisitions of the past and to create new knowledge. In its best sense the one function cannot survive without the fulfillment of the other. Creative scholarship is therefore as legitimate and as necessary to the life of the college as is teaching."[4]

This interdependency of scholarship and teaching, it seems to me, captures the essence of the research university in 1992 just as it did when that wise committee wrote these words more than 70 years ago. Unfortunately, this essence of a research university is sometimes not recognized. While the role of colleges and universities at the undergraduate level requires little explanation or justification, the rationale for university graduate and research programs is less well understood. A first rate graduate education and research program is essential at Rutgers to:

- advance knowledge through basic research;
- strengthen teaching at both the undergraduate and graduate levels through the discovery and transmission of cutting-edge knowledge by research-active teachers;
- educate the next generation of scholar-teachers by providing apprenticeships through formal degree programs;
- meet our responsibility as a state university to offer high quality graduate education in the arts and sciences and graduate professional training for the benefit of the people of New Jersey and to provide highly trained personnel for industry and the public sector;
- carry out research and make experts available for the solution of problems of direct concern to New Jersey and the nation.

Although these objectives are shared by most major research universities in the United States, Rutgers and its peers among the major state universities share a special obligation to serve the public through their programs of graduate education and research. Examples of ways in which Rutgers serves New Jersey through research in the sciences, education, the arts and humanities, politics, health and medicine, and government and the law abound.[5]

In addition to these important areas of research, Rutgers has other, special research and development responsibilities. In New Jersey, high technology industry has been rapidly expanding. Among the important factors that high technology companies consider when deciding where to locate or expand are the quality of a state's universities, the quality of its workforce, and the number of scientists, engineers and advanced degree holders. The role of graduate education and research in economic development will become ever more pivotal. Rutgers must remain in the center of a policy strategy that stimulates economic growth based on high technology.

Furthermore, as a densely populated coastal state, New Jersey has growing environmental problems of special significance that showcase national and international trends. Addressing these environmental needs clearly requires a special knowledge base. I am proud to note that Rutgers already serves New Jersey, the nation, and the global community well in these areas through our Institute of Marine and Coastal Sciences, the Fisheries and Aquaculture Technology Extension Center, the Center for Agricultural Molecular Biology, the Environmental and Occupational Health Sciences Institute, and through research projects on pollution in New Jersey bays and tributaries, coastal erosion, assessing the impact of acid rain, studying the effects of pesticides on farm crops, and other topics of environmental impact.

These highlighted efforts in environmental research, I wish to emphasize, are examples of Rutgers' basic research efforts that benefit New Jersey and the nation specifically in connection with the state's densely populated, coastal location. In all of the many areas of Rutgers scholarship, basic research advances knowledge, applies these advances to the formulation of policy, and transmits this knowledge to students.

Rutgers' Emergence as a Major Research University

Rutgers, as the youngest of America's public research universities, accelerated its progress in a preternaturally rapid ascent toward the highest ranks of its peers during the 1980s when New Jersey in its economic boom years decided that the state deserved a first-class university and gave it generous support. When the American Council on Education did its study of graduate education in 1970, only one Rutgers department received a rating of "good" or higher.[6] In 1982, when the Conference Board of Associated Research Councils repeated the ACE study, 14 Rutgers departments were rated that high, thus ranking Rutgers 12th among public universities in terms of the number of departments receiving such high ratings.[7] Unquestionably, if such a study were to be conducted today, our progress would be documented even more forcefully. In 1988 the Middle States Accreditation Team report on the New Brunswick campus noted that Rutgers' progress toward the goal of becoming a major research university "...has been rapid and dramatic. There is clearly a great deal of enthusiasm for this goal throughout the faculty and administration, and indeed throughout the state,"[8] and went on to point out that "...the effort to attract world-class scholarly leaders has been spectacularly successful."[9] The statistics chronicling Rutgers' emergence as a major research university in that period were nothing short of phenomenal:

- the number of applications to external agencies for research grant support increased from 909 in 1980 to 1400 in 1988;

- the number of projects funded from external sources increased by 82 percent, from 491 to 892;

- the funding from external sources more than tripled in the 80s, rising from $19 million in 1978 to $67 million in 1988, the year of the Middle States report;

- the number of university research bureaus, centers and institutes nearly doubled, increasing from 32 to 57, including eight new Advanced Technology Centers;

- the number of Rutgers faculty members honored with membership in the National Academy of Sciences and its two affiliated societies (medicine and engineering) increased from four to 20. Rutgers is the 6th-ranked public AAU institution in the country in NAS memberships;

- the number of Rutgers faculty members publishing in the best refereed journals, serving as editors or on the editorial boards of the highest quality scholarly journals, and serving as officers in national professional and scholarly societies increased dramatically.

The rapid ascendance of the 1980s was capped in 1989 with the admission of Rutgers to the Association of American Universities, the elite group of research universities to which just 56 of the United States' 3000 institutions belong.

But what is especially encouraging to me is that, while major strides were made by 1988-1989 toward the achievement of the high goals set in 1980, the history of Rutgers' rise to eminence has not only continued but has gained momentum in the 1990s. Despite the fiscal problems of the national recession, keenly felt in New Jersey, our collective external research funding has continued to rise, and our research institutes as well as our individual faculty and students have won national awards of extraordinary distinction. It would be impossible to list every piece of national and international recognition earned by a Rutgers faculty member, but a partial listing could include the following awards.

- Externally sponsored research has risen from $67 million in 1988, the year of the Middle States Report, to $116.2 million this past year, a remarkable demonstration of the continued success of the distinguished Rutgers faculty in competitive research awards despite the national recession and the recent deep cuts in state funding for grants and base budgets in higher education.

- Increased grant support from selected national agencies accents our dramatic success in the past two years, going from $16.4 million in 1990 to nearly $25 million in 1992 from Health and Human Services, from $13.8 million to $15.2 million from the National Science Foundation, from $1.5 million to over $8 million from the United States Department of Agriculture, from $240 thousand to $785 thousand from the NEH, and from $64.6 thousand to $985.5 thousand from the Department of Transportation.

- David Mechanic, University Professor, the Rene Dubos Professor of Behavioral Sciences, and Director of the Institute for Health, Health Care Policy and Aging Research, was elected to the National Academy of Sciences.

- Joachim Messing, Director of the Waksman Institute of Microbiology, was honored as the most cited scientist in the world in the last decade. His work has been cited 18,229 times in colleagues' research papers since 1980.

- James L. Flanagan, Board of Governors Professor of Electrical and Computer Engineering and Director of the Center for Computer Aids for Industrial Productivity, won the prestigious 18th Marconi International Fellowship Award. A member of the National Academy of Sciences and the National Academy of Engineering, Dr. Flanagan was cited for his pioneering contributions to speech technology.

- Allan H. Conney of the College of Pharmacy was invested as the William M. and Myrle W. Garbe Professor of Cancer and Leukemia Research at Rutgers. Dr. Conney received an $8.8 million Outstanding Investigator Grant from the National Institutes of Health in 1990, the largest federal grant ever received by a single researcher at Rutgers and the first of its type for any Rutgers scientist.

- The Center for Discrete Mathematics and Theoretical Computer Science, under the direction of the late distinguished Professor Daniel Gorenstein, received renewed funding of an estimated $10 million from the National Science Foundation.

- The Institute of Marine and Coastal Sciences, under the direction of Professor J. Frederick Grassle, was designated as the nation's sixth National Undersea Research Program Center.

- Rutgers faculty received three of the 100 National Science Foundation's Faculty Awards for Women. Winners of the prestigious $250,000 award were: Barbara Ryder, Associate Professor of Computer Science; Jolie Cizewski, Associate Professor of Physics, and Regina Liu, Associate Professor of Statistics.

- David Kosson, principal investigator, Associate Professor of Chemical and Biochemical Engineering, and Lily Young, co-principal investigator and Professor in Agricultural Molecular Biology (AgBiotech) and Environmental Science, won a $5.1 million grant from the U.S. Defense Advanced Research Projects Agency to study the bioremediation of aromatic contaminant mixtures in terrestrial soils and marine sediments.

- Elizabeth Norman, Assistant Professor, and Beverly Whipple, Associate Professor in the College of Nursing in Newark and Mary Greipp, Associate Professor in the Nursing Program in the Faculty of Arts and Sciences in Camden, were elected to the distinguished American Academy of Nursing.

- Susan Fuhrman, Research Professor and Director of the Consortium for Policy Research in Education at the Eagleton Institute, received $680,518 from the U.S. Department of Education to study systemic reform in education.

- Ana Maria Diaz-Stevens, Assistant Professor of Puerto Rican Studies, won the Cushwa Award for the best book manuscript on American Catholicism in 1991 - the second woman to win the award in 11 years.

- Philip Scranton, Professor of History at Rutgers-Camden, was awarded the Philip Taft Prize, an annual award acknowledging the nation's most outstanding book about the history of American labor relations.

- Benjamin R. Barber, Walt Whitman Professor of Political Science, during this past academic year occupied the French-American Foundation's Chair of American Civilization at the École des Hautes Études en Sciences Sociales in Paris.

- Eileen White, Assistant Professor at the Center for Advanced Biotechnology and Medicine (CABM), received a $1.2 million grant from the National Institutes of Health for cancer research.

- Arno Liivak, Professor of Law and Director of the Library of the School of Law at Rutgers-Camden, a native of Estonia, was appointed general counsel for Estonia's first diplomatic mission to the United Nations.

- Shirley Jackson, Professor of Physics, was elected to the American Academy of Arts and Sciences.

- Joel L. Lebowitz, George W. Hill Professor of Mathematics and Physics and Director of the Center for Mathematical Sciences Research, won the 1992 Boltzmann Medal by the Commission on Thermodynamics and Statistical Mechanics of the Union of Pure and Applied Physics. Dr. Lebowitz is also a member of the National Academy of Sciences.

- Associate Professor of Chemistry Joachim Kohn received a $345,600 research career development award from the National Institutes of Health.

- Mark Morgan, Associate Professor of Biology at Rutgers-Camden, received a $349,992 award from the National Science Foundation to assess the potential of freshwater wetlands to accumulate anthropogenic sulfur.

- Edward Arnold, Assistant Professor of Chemistry and faculty member at the Center for Advanced Biotechnology and Medicine, received a $225,000 grant from Johnson & Johnson for his research on viruses using X-ray crystallography.

- Paula Tallal, Professor of Neuroscience, was selected to give the Special Lecture of the 1992 Annual Meeting of the American Psychiatric Association and the Presidential Address of the Society for Neuroscience.

- Physics Assistant Professor Michael Douglas won a National Science Foundation Presidential Young Investigator Award for his work in theoretical elementary particle physics.

- Evangelia Micheli-Tzanakou, Professor and Chair of the Biomedical Engineering Department was honored as the 1992 Society of Women Engineers Achievement Award recipient, the highest honor bestowed by the Society of Women Engineers.

- Jean Marie Hartman, Assistant Professor of Landscape Architecture at Cook College, received a $200,000 grant plus a $14,000 donation to preserve the swamp pink, a rare species of the lily family which inhabits hardwood swamps primarily in and around the state's Pinelands and coastal plains.

- Fulbright grants were awarded to 16 Rutgers faculty and administrators in the last two academic years. The Rutgers-New Brunswick awardees were: Tayfur Altiok, Associate Professor of Industrial and Systems Engineering; Ross Baker, Professor of Political Science; Salah Soliman El-Shakhs, Professor of Urban Planning and Policy Development; Marsel Heisel, Associate Professor of Social Work; Patricia Tobin, Associate Professor of English; John Robinson, Instructor of English; Martin Alan Kesselman, Librarian, Library of Science and Medicine; and Robert Cooney, Executive Assistant to the Vice President for University Budgeting. The Rutgers-Newark awardees were: Farok Contractor, Associate Professor of Management; Frank Fischer, Associate Professor of Political Science; Olga Jimenez-Wagenheim, Associate Professor of History; David Hosford, Dean of the Faculty of Arts and Sciences-Newark; and Howard Latin, Professor of Law. The awardees from Rutgers-Camden were: Ann Blair-Brownlee, Assistant Professor of Art; Steven Darian, Associate Professor of Education; and Arthur Klinghoffer, Professor of Political Science.

- National Endowment for the Humanities grants were received by nine Rutgers faculty members and administrators in the past two years. In New Brunswick the awardees were: Hooshang Amirahmadi, Associate Professor of Urban Planning and Public Policy; Eileen Blumenthal, Professor of Theater Arts; Donald Gibson, Professor of English; Laura Kendrick, Professor of English; and

Virginia Yans-McLaughlin, Professor of History. The awardee from Rutgers-Newark was Janet Larson, Associate Professor of English; and the awardee from Rutgers-Camden was Richard Harris, Associate Professor of Political Science. Rutgers administrators who received NEH grants were Thomas Jeffrey, Associate Director, Edison Papers; and James T. Johnson, University Director of International Programs.

- Two of the 89 scientists chosen nationally to receive Alfred P. Sloan Foundation Fellowships in 1990-91 were Rutgers faculty: Michael Douglas, Assistant Professor of Physics, New Brunswick; and Olivier Mathieu, Visiting Associate Professor of Mathematics, New Brunswick.

- The American Council of Learned Societies awarded three fellowships to Rutgers faculty in 1991-92: Myra Bluebond-Langner, Professor of Anthropology, Camden; Deborah White, Associate Professor of History, New Brunswick; and Jan Kubik, Assistant Professor of Political Science, New Brunswick.

- Five prestigious Guggenheim awards were received by Rutgers faculty during this two-year span. The awardees, all in New Brunswick, were: Thomas Devlin, Professor of Physics; Ellen Rosand, Professor of Music; Laurie Sheck, Assistant Professor of English; Thomas Slaughter, Professor of History; and Bonnie Smith, Professor of History.

- Suzanne Lebsock, Professor of History, and Ingrid Daubechies, Professor of Mathematics, both of Rutgers-New Brunswick, were among the 33 winners of MacArthur Fellowships in 1992. The awards recognize extraordinary creativity and are informally known as "genius grants."

- The 1992 opening of the Aidekman Center housing the Center for Molecular and Behavioral Neuroscience marked a major step in the strengthening of Rutgers' research and graduate education mission on its Newark campus.

- In New Brunswick, the new Computing Research and Education (CoRE) Building was dedicated, and ground will soon be broken for the AgBiotech Plant/Life Science Building.

- The Plan for Rutgers-Camden Expanded, recently approved at all levels of university review, envisages significant steps in the enhancement and expansion of graduate education on the university's campus in southern New Jersey.

These accomplishments are dramatic and are recognized everywhere as indications of Rutgers' emergence as one of the finest public research and graduate institutions in the country. The university's reputation among its peers has never been higher.

Research and Graduate Education Goals for the Future

Rutgers University's dramatic rise to the top ranks of the major public research universities has probably been as rapid and as recent as any ever witnessed in American higher education. It has come with great commitment, effort, and sacrifice. Although it was achieved in a robust economy, it occurred largely after higher education's halcyon days of the 1970s, when so many other universities made their mark.

Having worked so hard to come so far, I assure you that Rutgers University is not going to turn back or rest contented with past achievements. The people of New Jersey deserve a fine public research university, and I intend to do everything that I can to see that Rutgers is one of the finest in the country. Our drive toward even greater excellence in graduate education and research must continue.

All the evidence indicates that we are continuing to move forward. In spite of the budget situation in New Jersey during the past two years, our continued emergence has been nothing short of astounding. Though it has been necessary to hire fewer new faculty members, the quality is stronger; though the size of the full-time faculty has diminished, external grant support for research has continued to increase; though it has been necessary to increase teaching loads and call on faculty members for other academic and service responsibilities, the number receiving prestigious scholarly awards and citations continues to rise. More undergraduate students are becoming involved in research, and I am confident

that departments will follow the recommendations that the University Committee on the Undergraduate Curriculum has suggested to draw more of our undergraduate students into direct research experiences.

Times are tough, no doubt about it. But, Rutgers is tough and we are going to continue with our drive toward excellence in research and graduate education. During the 1980s we moved into the most competitive classification of the nation's research universities, evidenced best, perhaps, by improved reputational ratings and membership in the AAU. During the 1990s I would like that drive to continue and to take Rutgers, The State University of New Jersey, into the very top tier of public research universities in the country, equalling or surpassing the very best of our peers in the public ranks.

Challenges and Opportunities for Expanding Excellence in Research and Graduate Education

Having achieved success, it is critical to sustain it and build on it to become still better. Obviously, I think continued excellence is imperative. It would be disingenuous of me, however, not to acknowledge that we face several challenges to our ability to maintain momentum in our continuing drive toward research and graduate program excellence. However, these challenges need not detract from our recent impressive gains. In fact, appropriate responses can make our programs even stronger. The challenges I describe can be opportunities for those who have vision and commitment. The key, it seems to me, lies in candidly acknowledging the difficulties, carefully assessing their possible impact, and devising strategies to respond to them effectively. In this spirit let me briefly describe what I think are some of the factors that we need to be most concerned about. These issues are not in any particular order and frequently overlap with one another.

13

Faculty Recruitment and Replacement. The strength of any graduate program and research effort depends primarily on the strength of its faculty. Other things are important, but no single factor is as important to the quality of a graduate education and research institution as the quality of the men and women in the classrooms and laboratories.

There are actually two dimensions of the faculty recruitment and replacement issue. One is the short-term aspect, i.e., how the budget crunch in New Jersey has and will affect Rutgers' immediate ability to continue to hire and keep the best faculty members available. The other is the long-term aspect, i.e., the effects of both the available pool of qualified scholars (the supply) and the expected need for them, given what we know about projected college graduation rates and graduate school attendance rates (the demand).

Let me talk about the long-term supply and demand issues first. The last decade or more has been a period in which the availability of Ph.D.s has exceeded the need in many fields, with the result that we have witnessed a weak job market for young academics. But that period will soon pass. We are about to enter a period in which the demand for high quality faculty members may outstrip the supply in the humanities and social sciences as well as in the sciences.[10] It may be difficult for institutions to recruit a sufficient number of high quality faculty members because the supply will be constrained. Among other things this means that the nation's graduate schools must find the resources needed to increase their enrollments and production of new doctorates; it also means that the inter-institutional competition for recruiting new faculty members may become more intense. This is complicated by the immediate problem of inadequate funding that we hope will be short in duration. So the signs suggest that we may face a double whammy: the available pool of trained personnel may be in short supply, and we will face resource constraints in recruiting.

Let me attempt to illustrate the severity of the problem we face by citing some data for the New Brunswick campus. Just four years ago, in 1988-89, 117 new tenure line faculty members were hired in New Brunswick. The next year the number of new hires dropped to 89, the year after that to 73, and this past year, AY 1991-92, only 49 new tenure line faculty members were hired. This is a drop of 58 percent in new faculty hires over just a four year period. The reason for this is not a loss of the will to make faculty recruitment and development our top priority. Rather, the systematic, sustained loss of over $100 million in our base appropriations and underfunding of salary agreements has caused this decline. Of 1,578 faculty members in New Brunswick, 250 (16 percent) are over age 60, and 41 percent are over age 50. Obviously, many faculty retirements are on the horizon. The combination of our thin budget and the smaller talent pool will make it doubly difficult to replace them.

We need a clear vision and a bold plan for action if we are to deal effectively with the faculty talent shortage that we and other research universities face in the years ahead. As an initial step, I have made faculty development the first priority in the university's 1994 asking budget. In a section labelled "Strengthening the University's Academic Program," we will request more than $3 million to "restore funding of faculty lines..." This single line-item is by far the largest single item in the 1994 asking budget. It is a reflection of my keen awareness of the severity of the financial aspect of the faculty recruitment problem.

But the plan that I have in mind needs to be more than a financial plan. Finances are an important part of the problem, but by no means the only part. Our plan should also consider ways of attracting faculty members at other institutions and newly-minted Ph.D.s to

Rutgers. It might also imaginatively explore ways of drawing upon the enormous talent pool available to us in the form of recent faculty retirees or soon-to-retire faculty members. I have asked the Vice President for Administration and Associate Treasurer to prepare a detailed projection of our expected faculty retirements and departures and use these data, along with New Jersey high school graduation and expected college attendance rates, to anticipate Rutgers' faculty staffing needs in the years ahead. This analysis, which I hope will be completed by the end of the academic year, will be shared with other appropriate academic administrators and faculty members for their advice and comment.

The Changing Nature of External Research Support and the Need to Establish Institutional Priorities. Through the 1980s external support for university research nationally increased by almost 73 percent, even though, during that same period, research universities experienced very little growth in the number of graduate students and faculty members.[11] During the same period, support from federal sources increased slightly in real dollars, but declined as a percentage of total external support due to the growth in support from non-federal sources, especially private industry.[12] Nevertheless, the federal government still accounts for nearly 60 percent of all external research funding, and therein lie potential problems.

One hardly needs a crystal ball to predict a decline in federal competitive research support. Obviously, competitive research dollars will be awarded in the same context of budgetary stringency that all other federal agencies are dealing with. And though our faculty

members have been successful in this increasingly competitive environment, it seems to me that the competition will become even more severe during the years ahead. We already know that in recent years the success rate among NSF applicants nationally has fallen dramatically.[13]

The decline in available research funding has obvious implications for planning our research and graduate programs at Rutgers. For one thing, it is apparent that we must continue to cultivate non-federal sources of research support. As I have indicated, non-federal support has grown to approximately 40 percent in recent years, and is likely to become an even more important source of research funding in the future.[14] It seems to me that it is now more imperative than ever that we deal directly with the university's priorities. The funding environment of the 1990s is clearly shaping up as one in which universities are going to have to realize they cannot be all things to all people. We are going to have to make some hard choices. The traditionalist critique sees the modern research university as one which, in its eagerness to address every social problem and beguiled by the availability of funds, moved too eagerly to create various research programs, centers, bureaus and institutes of doubtful intellectual merit.

Many observers have warned about the need to set priorities and be careful about trying to build programs in research and graduate education, especially in applied research, that promise to be all things to all people. A cogent expression of these views has been presented by David Saxon and Walter Milne: "[The university] must not be dominated by the transitory, the short term. Equally important in the conduct of applied research in our

public universities is the requirement that it have genuine intellectual content, engage the interest of the faculty, and, most of all, be intimately related to the education of students," and if the research "...does not meet our requirement of proper fit for the university, if it is not closely linked to education, we should not accept it."[15]

I think that these admonitions are wise and constitute reasonable if partial criteria by which we might review our research and graduate education priorities at Rutgers. The setting of priorities will not be a comfortable process, of that I am certain. But it is a necessary process, and one that cannot be postponed. I was very pleased to read the recent report of the Executive Council of the New Brunswick Graduate School that gives this priority-setting task a good start. Research and graduate education priorities will be reviewed as part of our strategic planning process.

In addition to these campus reviews and reports, we need to address the question of priorities in research and graduate education from a university-wide perspective. Critical analysis of our individual programs and their challenges and opportunities has been, since its inception, the work of the Committee on Standards and Priorities in Academic Development. Accordingly, I have asked the present Committee, to reexamine our graduate and research enterprise as a whole in the light of our long-range mission of research and graduate education at the very highest level possible, taking account of our strengths and weaknesses as a university. The task of the Committee will be to work with the Provosts in Newark and New Brunswick on their strategic plans in order to incorporate the important program review work of CSPAD into the priority-setting processes.

Since the Camden strategic plan is already completed, the Committee will be able to focus its attention on the other two campuses. The Committee will also work with the Provosts to suggest how the university can reallocate funds by a series of proposed mergers, suspensions, and cuts or by the less dramatic but perhaps equally effective process of shifting funds from lower to higher priority areas. We must find resources to strengthen existing programs and begin creative new ones by shifting existing resources. In the present financial climate, it is necessary that we lay a solid basis for the difficult decisions that we as a community must make in order to continue to grow in quality over the next decade. It is hardly original, but it is true that every crisis is also an opportunity. Our fiscal problems present Rutgers with an occasion for internal renewal from which, by action that is both bold and prudent, the university can emerge stronger than before. I have also asked the University Vice President for Academic Affairs and the Vice President for Institutional Research and Planning to work closely with the Committee and the campuses as they formulate their plans for presentation to the university. These reports should be submitted to me by the end of the 1993 calendar year.

Maintaining Libraries, Facilities and Equipment. For both research and graduate instruction, the maintenance of adequate facilities, equipment, and libraries is an expensive matter. The costs of equipment and facilities have escalated rapidly, and, unfortunately, expensive equipment often becomes obsolete within a few years, especially in some of the sciences. While costs have been going up, funds for instrumentation and facilities have been declining. For example, in 1965 the federal government provided about $126 million for research facilities on university campuses, but by 1979 that figure had shrunk to about $32 million in current dollars.[16]

The situation with regard to research and graduate libraries is much the same. Costs have escalated rapidly. It has been extremely difficult for universities just to keep up. At Rutgers we now spend about $4.3 million per year on journals alone, nearly one million more than we spent just four years ago, even though the number of journals we receive has not increased. This incredible inflation has reduced the purchasing power of the journal acquisitions budget at an alarming rate. At the same time we have been forced to reduce our purchase of books considerably. Though these same difficulties plague other institutions, the severity of the problems at Rutgers has been worse, as evidenced by the fact that Rutgers' ranking among the 107 institutions in the Association of Research Libraries' annual report has dropped over the last three years from 16th to 31st in volumes added. Now we learn that the price of journals next year is expected to go up approximately 12 percent and books by 10 percent, despite a weak economy and a forecast of modest price changes in most other goods and services. Alternatives such as computer-based document delivery systems should help, but will by no means eliminate the very serious problems we face during a period when graduate student and faculty needs for depth of holdings, speed of information access, and reliability of service will continue to rise.

Computer Facilities. We face enormous challenges in the next few years and beyond with regard to computing at the university. This past spring, a committee of faculty, administrators, and students issued a report acknowledging that Rutgers "...is seriously lagging in the computer revolution..." and called for a transformation of the university, one which would modernize the university's computing resources for research, teaching, and

administration.[17] According to the report, Rutgers does not compare favorably with other AAU public institutions, and our computing needs are woefully inadequate with regard to networking, student and faculty access to terminals, adequate software and data bases, resources for numerical-intensive computation, and staffing. Among many other things, the committee recommended:

- timely completion of the university-wide network, both between and within university buildings, since this is the technological foundation for most of the computing and information activities of the university in the 1990s;
- improvement of the ratio of students to available microcomputers to 35:1 from the 200:1 ratio that currently exists, achieving this more favorable ratio with approximately 1,400 additional work stations;
- by 1995 having an appropriate workstation or microcomputer available to all faculty members at their desks, with access to the university network;
- expansion of the High Performance Computing Program to provide additional campus access centers and staff, and to support Rutgers researchers developing programs for parallel computers at the National Supercomputer Centers.

Unfortunately, the committee also noted that the financial resources necessary to bring about the transformation that they recommended are significant.

One important step in the right direction is the possible development of a state-wide bond issue for higher education instructional equipment. A state task force with significant Rutgers participation is already working on a needs assessment for a bond issue. I strongly support this effort. Part of the solution will also be found in the freeing of funds to address our university-wide needs and priorities. We must also learn how to share better, share among different individuals working on different projects, share among departments within the university, and share with other universities. I am pleased to note the recent initiatives of our libraries to establish priorities with faculty working groups and explore alternative text and electronic technologies. We must continue to pursue these possibilities.

Graduate Student Financial Support. Many members of the faculty and administration regard inadequate fellowship and assistantship support for graduate students as the single most pressing problem threatening Rutgers' continued forward surge as a major research and graduate institution. It would be hard to disagree with this assessment. On the basis of the evidence I have seen, it is clear that we must be able to compete favorably with other major research universities in this regard. For example, when compared to 15 other public AAU institutions on the number of teaching assistantships available, our New Brunswick programs lag behind in most disciplines. In fact, in several disciplines we rank dead last.[18] It is disheartening for our graduate program faculty members to know that they stack up with the best programs in the country in terms of other aspects of doctoral program quality, but often lose their most promising students to other institutions because we could not offer sufficient financial support. It is most encouraging that, in spite of this inadequate support, the quality of our entering graduate students has grown steadily stronger in recent years. They now come from better undergraduate institutions, bring better undergraduate records, and show higher GRE scores.[19] This is a real tribute to the quality of our graduate faculty and programs, but we should not delude ourselves. The competition for the best graduate students in most disciplines is going to get very keen in the years ahead, and if we cannot offer the best students the kind of financial support that they deserve and that they will be offered by other institutions, Rutgers will surely fall behind.[20]

I would also like to point out that teaching and research assistantships provide graduate students with much more than financial aid. Such experiences constitute a primary way in which graduate students learn what it is to be a university teacher and researcher. Thus, adequate assistantship and fellowship support is an essential element of any first-rate graduate student experience. I am asking the graduate deans to explore the feasibility of fundraising as a means of bolstering the financial aid and professional development we offer to graduate students in the form of fellowships, teaching assistantships, and research assistantships. Fundraising for this purpose will also be a high priority of the Vice President for Research and Graduate Education. As an example of what I have in mind, just this summer Rutgers received a generous gift of $800K from a private benefactor, and I have decided to dedicate the annual interest on that gift to graduate student support. That annual interest should make it possible to provide three or four fellowships for graduate students each year. Also, several years ago, as a step to compensate for the end of the New Jersey Garden State Fellowships Program for graduate students, Rutgers announced the creation of the first Rutgers Graduate School Fellowships for arts, humanities, and social services doctoral students. Though funds are scarce, we must continue this program. I announced my approval of a fourth cohort of these Graduate School Fellows last autumn. We have made a very good start toward the sort of program of graduate student support that we need. Now we need to keep that momentum and build on these past successes.

While on the topic of attracting good graduate students, let me turn my attention to a related issue. One of the highest social priorities for graduate education in the 1990s must be to increase the number of minority graduate students, especially in the sciences. Of 36,027 Ph.D.s awarded in the United States in 1990, only 828 (2.2 percent) were awarded to African Americans.[21] Though Rutgers has an outstanding overall university record of minority student recruitment and retention,[22] the number of minority graduate students is still relatively small, in spite of our continuing conscientious efforts. For example, last year in the Graduate School-New Brunswick (the university's largest graduate unit), of nearly 5,000 graduate students only 120 (2 percent) were African American, 146 (less than three percent) were Puerto Rican, non-Puerto Rican Latinos, and American Indians. The meager enrollment of African American students is particularly distressing, since the Graduate School-New Brunswick enrolled 168 African American graduate students just 10 years ago. But, paralleling national trends, our enrollment of African American graduate students declined steeply between 1980 and 1987. Fortunately we have had more success in New Brunswick in the past two years, due largely to the efforts of the Minority Advancement Program (MAP), but the numbers are still considerably below what we would like.[23] The picture is brighter in the Graduate School-Newark, where, of 1,256 enrolled students last year, 111 (9 percent) were African American and another 61 (5 percent) were Puerto Rican, other Latino, and American Indians.[24] Clearly a special effort will be necessary to achieve a significant increase in the number of minority graduate students at Rutgers, but that effort must be made. The issues involved are complex, but the central objective must be to

set in motion a self-sustaining process whereby minority participation is the norm, not the exception.[25] I would like to see the formation of special relationships with several excellent historically black colleges and universities such as Howard and Xavier from which we could draw highly qualified students to our graduate programs.

Finally, another area of needed support for graduate students is for adequate family housing. Currently we estimate that we are able to provide family graduate student housing for approximately half of those who need it. While this may appear to be less important than providing fellowships and assistantships, the absence of adequate housing is clearly a factor that affects the enrollment decisions of prospective students. The availability of adequate family housing is not only a financial factor, but a social and educational factor of considerable consequence. We must find a way to improve our facilities.

Graduate Student Professional Development. The fact that many of our graduate teaching assistants and those in other research universities were ill-equipped to carry out their responsibilities in undergraduate classrooms and laboratories was brought forcefully to the attention of the academy only a few years ago. Perhaps more than anything else, that oversight led many to the erroneous conclusion that first-rate graduate and undergraduate programs cannot co-exist. We are still fighting that battle. Fortunately, Rutgers now has excellent graduate teaching assistant training programs on all three campuses.

Though these training programs are already strong, I think we must see to it that they are expanded to a point where every graduate TA participates. In addition, I would like to see these programs evolve into activities that are designed not just to prepare our graduate students for their roles as TAs at Rutgers, but for roles many of them will subsequently take on as college teachers and faculty members. In effect, I am envisioning a program of several years duration, carried on within the departments as part of the normal course of graduate training. The plain fact is that, while American graduate schools by and large do an outstanding job of training future researchers and scholars, they normally do not do a very good job of preparing future college teachers. This is shortsighted, since many of the Ph.D. students who walk out our doors will spend more time in teaching, not conducting research. This is hardly a new observation. More than 40 years ago a high-level Presidential Commission criticized research universities for their "seriously inadequate" attention to preparing graduate students for college teaching,[26] a decade later Bernard Berelson made the same observation,[27] and it has been echoed by various committees, organizations, and scholars ever since. This seems to be one of those instances in which there is complete agreement about the problem, but general uncertainty--or perhaps the lack of will--to do much about it. I am confident that we can continue to improve training at Rutgers in preparing graduate students for future roles as both researchers and college teachers, and I challenge our graduate schools and departments to continue to take this responsibility seriously in the years ahead.

Balancing Research and Graduate Education with Undergraduate Education.

No belief has placed more stress on American graduate schools in recent years than the fairly widely-held notion that high quality graduate programs spawn second-rate undergraduate experiences. As the pendulum of national attention in recent years has swung toward undergraduate education, claims about the incompatibility of the two institutional missions abound.

I think that those who claim that research and teaching are incompatible are just plain wrong. The gist of the "research harms teaching" argument is that, where both missions exist, they inevitably conflict and teaching loses. I addressed some of these issues in my paper Undergraduate Education at Rutgers: An Agenda for the Nineties, that I issued last year. In that document and in other places I have made it clear that teaching shall be highly valued at Rutgers and that performance in the classroom as well as in the research laboratory is necessary. We have also been extremely careful about monitoring teaching loads, class sizes, and resource allocation.

I am confident that at Rutgers the enhancement of research and graduate program quality strengthens the undergraduate experience. At the same time, I know that we can do better. Planning for the involvement of as many of our excellent undergraduate students as possible in research is one good way to accomplish our goal. Another possible improvement would be to move away from the expectation that all faculty members will be heavily engaged in research and scholarship at all stages of their academic careers. To expect all faculty members to be consistently imaginative creators of new knowledge throughout their entire academic careers is highly naive, it seems to me.

One possible way of beginning to address this problem would be through a program of individually tailored workloads for our tenured faculty members that straightforwardly takes account of changing faculty interests and preferences during long academic careers. Such academic rhythms are sometimes quite pronounced. Via this program, tenured faculty members who wished to shift the balance of their effort from research to teaching and service could do so, and shifts in the other direction could also be accommodated.[28]

Let me emphasize that only tenured faculty members should be eligible to apply for such individually tailored workloads, since untenured faculty obviously need to bring both their teaching and their research to the level expected of a candidate for tenure at Rutgers, both for the sake of their own professional development and in order to prove themselves to the university. Nevertheless, taking into account the length of the expected career of a faculty member and the diverse opportunities that may arise for each individual, the program could provide a realistic means of moving away from the expectation that every faculty member is obligated to do approximately equal amounts of research, teaching, and service, and toward an arrangement that is more flexible and tailored more to individual strengths and commitments. This is an idea that I would like to try here at Rutgers, beginning with experimental programs in several departments to see how the idea works in practice.

Declining Public Trust. I see a final challenge to Rutgers' continuing research and graduate education progress in the recent but undeniable decline in public trust and an increase in public suspicion about the purposes and practices in the academy. Until recently, higher education was one of the most trusted of all American institutions. Opinion poll after opinion poll consistently indicated that Americans saw colleges and universities as institutions that could be relied upon to conduct their business openly and honestly. Unfortunately, that has changed.[29] The incidents that snowballed to bring about this changed perception of higher education are numerous, and include:

- incidents of scientific misconduct, best characterized, perhaps, by the celebrated case of Dr. David Baltimore and his colleagues, gave rise to questions about how much science is fiction, and at whose cost;

- cases suggesting that universities are possibly greedier than some had thought (or hoped), typified, for example, by the unfortunate "cold-fusion controversy" at the University of Utah;

- discovery of blatant plagiarism by several individual scholars;

- the now infamous "overhead rate controversy," and especially the revelation that some major universities had clearly been careless in the way federal monies had been spent;

- the recent Congressional hearings on the cost of public higher education accusing universities of charging more for less and citing lower faculty teaching loads, large classes, and undergraduate instruction by teaching assistants.

In addition to these incidents that pertain specifically to graduate education and research, public trust in universities in general has declined, abetted by a panoply of public relations nightmares including athletic scandals, sharply rising costs, assaults on the curriculum and "politically-correct" thinking, charges of racism, sexism, and just about any other "ism" you can think of.

In the public's mind, the truth in each of these incidents is magnified so that discrimination is no longer possible; one incident at one institution tarnishes all of higher education. It does not matter that the number of cases in which scientific misconduct has occurred is minuscule, that financial greed rarely enters into decisions about research and development in the university, that some universities' misuse of federal grant funds was an exception to the rule, or that plagiarism is rare. Given the nature of our modern media and the public's appetite for the sensational, rare events lead to general perceptions of wrongdoing, and all of us suffer.

Obviously, there is no single answer to these issues. Vigilance in everything that we do is essential and will always characterize our work, but it will not prevent some continuing misperception or misunderstanding. Nevertheless, we shall continue with all our administrative/academic accountability procedures--e.g, the financial audits, the external program reviews, the athletic oversight activities, and all the rest of it--because these are the appropriate ways for us to conduct our business. With regard to the charges of scientific and scholarly misconduct on the part of faculty members, the program that was begun in New Brunswick recently to train graduate students to be ethical professionals is an excellent idea, and will help give young scholars a better understanding of proper scientific and scholarly conduct. I would like to see this program continued, and perhaps expanded in the future to new faculty members.

Brief Summary and Concluding Statement

In this paper I have revisited Rutgers' ascendance into the upper echelon of public research universities and have described several challenges to our ability to continue our drive toward excellence in our programs of research and graduate education. Briefly, the challenges that concern me the most and the actions I propose to meet them are:

- difficulty in recruiting faculty due to both our budget cuts and a dwindling faculty pool. In addition to asking for university analysis of the problem, I have made strengthening our faculty our top budget priority.
- declining external competitive research support. To set priorities and shift funding from lower to higher priority areas, I have asked the Provosts to engage in strategic planning with the assistance of the Committee on Standards and Priorities in Academic Development.

- deteriorating libraries, facilities, and equipment, including computing systems. I have endorsed a possible state bond issue for this purpose.

- inadequate graduate student financial support. I have renewed the Rutgers Graduate School Fellowships and dedicated a large private gift to graduate support. Special efforts to recruit minority students should include relationships with some excellent historically black institutions.

- inadequate preparation of graduate students as college teachers. I have called for an expansion and extension of the teaching assistant training programs.

- imbalance between research and graduate education and undergraduate education. In addition to efforts to involve undergraduates in research, I propose an experimental program that would offer tenured faculty the flexibility to switch the balance of their effort toward more teaching and service.

- declining public trust. I have asserted that we must continue to follow our many administrative/academic accountability procedures and have suggested that we continue and expand efforts to train graduate students to be ethical professionals.

I realize that the challenges I have described are great, but we are already engaged in strategic planning to meet them. Careful, well-considered pruning, carried out through the proper collegial process of consultation and approval, is an appropriate response to our present fiscal situation and should result in a healthier, stronger, more flexible university. Funding freed through our planning process should assist us in addressing the needs of the weakening infrastructure of graduate education and should allow us more latitude in responding to special opportunities in existing programs and new areas of study.

In the first section of this paper I highlighted this university's unprecedented growth from a good state institution to an outstanding international research university and the rising momentum of that growth to even greater distinction in the 1990s. This remarkable

achievement is recognized among college and university administrators and faculty members throughout the country as one of the real Horatio Alger stories of American higher education. I do not intend to close the book on this great story. Nor do I intend to allow the challenges that I described earlier to turn us from our goal. Rutgers, The State University of New Jersey, has become one of the best research and graduate institutions in the country. With vision, commitment and hard work, we can continue to become an even better and more distinguished university for the benefit of New Jersey and the pride of its citizens.

END NOTES

1. Francis L. Lawrence, The Joint Future of New Jersey and Rutgers, The State University of New Jersey, January, 1991.

2. Francis L. Lawrence, Undergraduate Education at Rutgers: An Agenda for the Nineties, 1991.

3. Richard P. McCormick, Rutgers: A Bicentennial History. New Brunswick, N.J.: Rutgers University Press, 1966.

4. Ibid., p. 190.

5. For details of these and other examples of Rutgers' service to New Jersey, see The Joint Future of New Jersey and Rutgers, The State University of New Jersey, op. cit.

6. Kenneth Roose and Charles Andersen, A Rating of Graduate Programs, American Council on Education, 1970.

7. Lyle V. Jones, Gardner Lindzey, and Porter E. Coggeshall (Eds.), An Assessment of Research-Doctorate Programs in the United States, National Academy Press, 1982.

8. Middle States Association Evaluation Team, Report to the Faculty, Administration, and Students of Rutgers University, 1988, p. 7.

9. Ibid., p. 8.

10. William Bowen and Julie Ann Sosa, Prospects for Faculty in the Arts and Sciences, Princeton University Press, 1989.

11. Roger L. Geiger, "The Dynamics of University Research in the United States, 1945-90," in Research and Higher Education: The United Kingdom and the United States, (Thomas Whiston and Roger Geiger, Eds.), The Society for Research into Higher Education, 1992.

12. Ibid.

13. Joseph Palca, "NSF: Hard Times Amid Plenty," Science, 248, April 27, 1990, pp. 541-543.

14. Fateful Choices: The Future of the U.S. Academic Research Enterprise, Report of the Government-University-Industry Research Roundtable, National Academy Press, 1992.

15. David Saxon and Walter Milne, "Research, Graduate and Professional Education: Some Observations and Issues," in The Future of State Universities: Issues in Teaching, Research, and Public Service, Leslie Koepplin and David Wilson (Eds.), Rutgers University Press, 1985, p. 13.

16. Robert Rosenzweig, The Research Universities and Their Patrons, Berkeley, CA: University of California Press, 1982.

17. The Report of the Committee on Computing and Information Planning: A Transformation of Computer and Information Technology at Rutgers, The State University. (Joseph Potenza, Chair) New Brunswick, N.J.: Rutgers, The State University, March, 1992.

18. The last-ranking departments are economics, history, mathematics and political science. Biology, philosophy, and psychology fare only slightly better. For further details, see appendix F of the Report of The Provost's Committee on Undergraduate Education in the Context of a Research University, July, 1990.

19. This reflects the fact that Rutgers' graduate programs have become considerably more selective. For example, in 1986 our various graduate programs received 16,633 applications, and we admitted more than half of them. Last year we received 22,396 applications (35 percent more than just five years ago) and we admitted only 43 percent. It is hardly surprising that our graduate students have gotten better. From 1986 to 1991, the mean GRE scores for applicants university-wide went from 1097 to 1121, and for the Graduate School-New Brunswick scores went from 1118 to 1157. Also, undergraduate GPAs have remained high, even though the students now come from stronger undergraduate institutions.

20. As Donald Stein, Dean of Rutgers' Graduate School-Newark, pointed out recently, the most serious competition will likely be for American graduate students. (See the Graduate School-Newark Annual Accountability Report, (1990-91). As is the case around the country, declining interest in graduate study among American college graduates, especially in the sciences and humanities, means that Rutgers graduate programs are increasingly relying more heavily on international students.

21. Anthony DePalma, "Drop in Black Ph.D.'s Brings Debate on Aid to Foreigners," New York Times, April 21, 1992.

22. Statistics from the U.S. Department of Education indicate that Rutgers University-New Brunswick is now the 2nd-ranked predominantly white public or private university in the entire nation in terms of number of undergraduate degrees awarded to African American students.

23. From the 1990-91 Annual Accountability Report of the Graduate School-New Brunswick, October, 1991. The Minority Advancement Program (MAP) is a New Brunswick-based office with the primary responsibilities of improving minority graduate student recruitment and retention.

24. From the Registrar's Fall 1991 Enrollment Report.

25. See Research Universities and the National Interest: A Report From Fifteen University Presidents, Ford Foundation, 1978.

26. President's Commission on Higher Education, Higher Education for American Democracy. Vol. 4: Staffing Higher Education, December, 1947.

27. Bernard Berelson, Graduate Education in the United States. McGraw-Hill, 1960.

28. See Richard Atkinson and Donald Tuzin, "Equilibrium in the Research University," Change Magazine, Vol. 24 No. 3, 1992.

29. When Louis Harris began to conduct such polls back in the 1960s, 61 percent of Americans said that they had "a great deal of confidence in the people running higher education." When asked that same question in 1992, 25 percent gave the same answer. See "Seeing Ourselves as Others See Us," AAHE Bulletin, 44, 10, June, 1992.