

**FOR COMMENT**

## The Penn Profile



*Almanac*

Supplement to Volume 31, Number 34  
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## To the University Community:

Penn has reached a key phase of the planning effort we began four years ago. This effort will help guide resource investments over the next five years. In "Choosing Penn's Future" we identified three special challenges facing the University—undergraduate education, research excellence, and student financial assistance. "Investing in Penn's Future" proposed means to help meet those challenges—a University Education Fund, a Research Infrastructure Bank, and the Penn Plan.

The strength of this planning, of course, depends fundamentally on our Schools and departments and their connections to the institution as a whole. Individual faculty members, in conjunction with their departments and Schools, bear principal responsibility for the University's instructional and research programs.

"The Penn Profile" that follows is a draft planning paper published for your comment. It summarizes the activities each School projects in terms of research excellence and undergraduate education and outlines major initiatives each is planning. The paper also reviews concerns each School faces in fulfilling its promise.

We prepared this paper based on our review of the Schools' individual draft plans, and our exchanges with the Deans and others in the Schools concerning those plans. The Academic Planning and Budget Committee played a key role in preparing the paper, and each School Dean has reviewed the current version. A fuller picture of each School's plan awaits further work and review before being published in separate form. Naturally, these plans—like those of the University as a whole—must be regularly revised and brought up to date in light of changing circumstances.

Some may wish we had been less frank in assessing a particular School's situation. Others might wish we had been bolder in identifying where the University needs to cut back or expand. Our response to both reactions is the same. We must do more than simply salute our strengths. We must also remind all within the University that there is no "short list" of departments earmarked for special status or drastic reduction. We hope the enclosed draft makes clear that we do not believe academic planning works that way.

We have sought an approach to which the entire University could respond. We have asked each School to draw upon its faculty to identify investment priorities of its own—where, given sufficient opportunities and resources, the School will make new faculty appointments or initiate new programs of research and instruction. The clearer the statement of those priorities and the means for their implementation, the easier it is for the University as a whole to understand the relative importance of different needs and thus to plan rationally.

We hope that over the summer you will consider not just our summary of your own School's draft plan, but also the paper's composite profile of the University and of the balanced diversity that makes Penn unique. We plan to revise this paper in light of the comments we receive and to publish it next fall, together with "Investing in Penn's Future."

We solicit your suggestions and encourage full review by faculty, students, and staff. Please send your comments to either of us.



—Sheldon Hackney, President



—Thomas Ehrlich, Provost

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## Almanac

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# The Penn Profile

## Preface

This paper, in conjunction with "Investing in Penn's Future," will help guide the investment of resources over the next five years. It is a product of the planning process that began in the summer of 1981 with a review of the University's plans, priorities, and prospects, and continued through the publication of "Choosing Penn's Future" and a spring 1984 report to the campus on the progress made toward developing School and University plans. Integral to this process has been the continuing guidance of the Academic Planning and Budget Committee.

This paper is organized to provide both context for and details of current School planning. The central section describes each School's planning as viewed through the framework of University priorities and goals. Even after the School plans have been published for comment, they will, of course, be subject to change with varying circumstances and through regular review and update.

The paper as a whole is divided into four sections as follows:

**Section I, The Planning Process**, describes the University's planning perspective and the basic components of planning.

**Section II, School Plans**, incorporates into a consistent framework each of the twelve Schools' responses to the University priorities of undergraduate education, research excellence, and student financial aid and assistance. Each School is discussed first in terms of its current setting, then in terms of its responses to University priorities, pertinent concerns, and prospects.

Collectively, these descriptions have been presented in three groups: Undergraduate/Graduate Schools, Medical Science Schools, and Professional Schools. Within each of these groups individual Schools are ordered alphabetically. Other groupings could obviously have been chosen, but these seem most helpful for the purpose of this paper.

**Section III, Balanced Diversity**, uses the same classification system in examining the relative scale of groups of Schools in terms of faculty size, revenue, and capital expenditures.

**Section IV, Next Steps**, concludes by defining the University's upcoming initiatives toward a program of strategic investments within the context of the continuing planning process.

# I: The Planning Process

Planning at Penn is based on a central tenet. It holds that the quest for knowledge is an inherently decentralized endeavor in which scholars, even when they join in collaborative research, must maintain their independence and the right to establish their own agendas. The academic enterprise flourishes best when those scholars have adequate support to explore their unique interests. In this sense, the concept of a planned university—when it implies that a central administration defines the direction and pace of future inquiries of the university as a whole—is a contradiction in terms.

The University, then, engages in planning to create an environment that supports and coordinates independent scholarly inquiry. This planning is an integral part of every administration's stewardship of the University's traditions and resources. In its simplest form, planning is financial. Through financial planning, the University achieves a balance between income and expense while maintaining both its scholarly and physical assets. Good planning is also programmatic, concerned with articulating the University's agenda. Without limiting the independence of inquiry, planning seeks to make certain that such independence is used purposefully, by asking that the University as a whole, as well as its constituent parts, state clearly their main objectives and priorities.

Finally, good planning is strategic, drawing on the collective aspirations and shared values of the community to define common goals to guide future investment. Such planning requires an understanding of the University's external environment: those agencies and individuals whose collective actions affect the University's level of resources and freedom to determine its own direction. Given the constraints these variables imply, strategic planning depends on an accurate reading of the University's current strengths and weaknesses as well as its comparative advantages among the nation's leading research universities. The goal is a widely shared consensus as to where the University should invest its discretionary resources in both strengthening current programs and stimulating new ventures.

## Financial Planning

The planning cycle at Penn that began in 1981 has addressed all three modes of planning: financial, programmatic, and strategic. Financially, Penn entered the 1980s in a position marked by both strengths and weaknesses. Compared to most of its peers, Penn remains significantly underendowed. The development program that has emerged from the current planning process, "Building Penn's Future," as well as efforts to enhance annual giving, are important steps toward improving Penn's ability to strengthen its academic programs. Penn's particular financial strength, relative to most of its peers, has been that it maintains balanced budgets based on a decentralized management system that encourages individual initiative. The financial planning made possible by Penn's responsibility center budget system ensures that we understand the financial future of each of the University's individual units as well as Penn's collective financial viability.

The Academic Planning and Budget Committee, the Council of Deans, the University's senior management, and others, are now planning a number of secondary revisions to enhance responsibility center budgeting. In addition, one major change is planned. While the Library will retain its status as an independent resource center, its costs will be allocated to the Schools. During the first year of this change, each School will have its base subvention increased by an amount equal to its share of the Library's allocated costs. To ensure that the Schools help shape the Library's future budgets, the Deputy Provost will chair a standing subcommittee of the Council of Deans to work with the Director of Libraries.

## Programmatic Planning

Programmatic planning within the University has taken place principally on two levels. Centrally, we began with working groups, composed largely of members of the Council of Deans, whose task was to survey the University's policies, priorities, and prospects in six major areas: minority faculty and students, undergraduate education, graduate education, research capacity, educational outreach, and ties with the City of Philadelphia.

In the area of undergraduate education, these efforts led to the establishment of the Faculty Council on Undergraduate Education. In its second year, the Faculty Council pursued initiatives to help bring more of the University's resources to bear on undergraduate education. With the overall goal of developing common academic experiences for undergraduates, the Council is designing a set of courses to provide students with insight into the principal fields of the arts and sciences, establishing mechanisms for the support of undergraduate research, and expanding both the successful course in ethics and the Discovery and Meaning Lecture Series. In addition, it seeks to incorporate into the formal curriculum and student life an emphasis on both the urban identity and international dimension of the University. Toward this end, it is promoting Philadelphia as a learning resource and encouraging foreign language and culture study for undergraduates.

On the School level, the five-year planning—which frequently included the development of departmental five-year plans as well—has produced a remarkable articulation of the breadth and depth of the University's instructional, research, and service programs. While substantial work is still required on School plans, it is clear that the planning process has succeeded in highlighting the diversity and innovativeness of Penn's educational offerings.

In this document we summarize each School's draft plan as it relates to overall University planning. After further review and consultation, we expect next year to begin publishing the School plans individually for comment, in order to present the full measure of each School's strengths and opportunities.



## Strategic Planning

It is in the third realm, strategic planning, that we have concentrated most of our energies, in part because of the complexity of the task, and in part because we sensed that this was a special moment in the University's history. "Choosing Penn's Future," published in final form in January 1983, set forth four basic goals for this strategic planning:

- to preserve and strengthen the quality of the faculty, Penn's "most important resource";
- to conserve resources and protect Penn's financial integrity by ensuring that "academic aspirations and plans . . . conform to budgetary constraints," that "academic priorities shape budget decisions," and that there is an "efficient utilization of campus space";
- to make certain Penn remains a community that gains strength through diversity, most particularly the diversity that comes from having a faculty, students, and staff comprising "men and women of different races, religions, nationalities, regions, and economic backgrounds";
- to make quality more important than scale, by insisting that each School ensure adequate support for continuing faculty before considering filling vacancies or creating new faculty positions.

Our judgment, since supported by the School plans, was that these goals could be achieved by focusing the University's energies in three broad areas:

- undergraduate education,
- research excellence,
- student financial aid and assistance, including special funding for graduate fellowships.

In the past three years, positive advances have been made in each of these areas. In 1983, we established the Penn Plan, which will help guarantee our ability to continue to offer "need-blind" admissions to our undergraduate Schools. This fall the Penn Plan will be extended to professional Schools. We have also more than tripled unrestricted funding for graduate fellowships—an investment we will continue to increase over the next five years.

In January 1985 we announced two major mechanisms for investing in Penn's first two priority areas: a five year, \$10 million expansion of the Undergraduate Education Fund beginning in FY 1987; and a \$40 million Infrastructure Bank, whose initial capital will derive from the Reserve for Physical Plant and from external borrowing. The strategic importance of these special investments was presented in "Investing in Penn's Future" in January 1985. That paper also described how a strategy of collective investments can help Penn come to terms with a striking paradox.

Penn's special comparative advantage among great research universities is in the extraordinary interaction among our academic programs. Yet we remain a University best known by our constituent parts. As a consequence, Penn often lacks that institutional identity characteristic of many of the great universities with which we compete for students, faculty, and support.

The strategic challenge we face over the next decade is to develop a greater sense of ourselves as belonging to a single institution. Over the next decade we must both strengthen the separate parts of the University and foster among them a greater sense of mutual dependence, interaction, and shared opportunity. The result will be a more coherent University, based on stronger connections among Penn programs and people.

Most important is the basic conclusion of "Investing in Penn's Future":

The making of targeted investments in support of University priorities is a key element in our strategy for building a University that is—and is seen as—more than the sum of its parts. These targeted investments will enhance Penn's interactive strength. The national exploitation of our comparative advantage requires that the rich diversity of disciplines at the University be maintained, and this in turn means that we must also be concerned that no one component dominate public definitions of the University as a whole. What gives Penn its competitive advantage, as well as its distinctiveness, is its balanced diversity. The vision of the University we have set forth calls explicitly for a sense of interdependence among all of our Schools—a sense that none would want to go it alone even if it were able.

## II: School Plans and University Priorities

It is this sense of interdependence that best characterizes the Schools' own plans for the next five years. While some Schools have active planning processes dating back to the 1970s, systematic School planning within a University-wide framework began with a meeting of the Council of Deans at the Morris Arboretum in the summer of 1981. From that meeting emerged the first tentative listing of priorities as well as an understanding that the Schools themselves, through consensus and joint venture, bear principal responsibility for extending the interdisciplinary reach of the University. It was also agreed that the Schools would establish planning processes of their own to parallel and complement the central administration's planning initiatives. In October, 1982, the Deputy Provost, following the formal request for School plans in "Choosing Penn's Future," provided each School with a detailed list of the questions its plan was expected to address. At the same time, the Academic Planning and Budget Committee, chaired by the Provost and including faculty and students drawn from across the University, established subcommittees to work with the Schools and eventually review their plans.

First drafts of all School plans were completed by April 1984. In most cases, review by the Academic Planning and Budget Committee led to further responses from the Schools and then revisions in their plans. At the same time, the Deputy Provost began working with each of the Schools to project faculty appointments over the next five years. In the fall of 1984, the Deputy Provost, on behalf of the Academic Planning and Budget Committee, again wrote to each School, asking for updates to their plans and reports on their current strategies for

- increasing standing faculty salaries;
- improving support facilities and services;
- increasing minority faculty and students;
- strengthening and expanding research activities;
- improving the undergraduate experience at Penn;
- strengthening programs leading to the doctoral degree;
- ensuring students access to adequate financial assistance.

In sum, the School planning from which we derived our descriptions below are the products of more than three years of interaction among the administration, the Academic Planning and Budget Committee, and the Schools themselves, including School planning committees. The descriptions included here, which focus on the relation of School plans to University plans and priorities, were drafted with the assistance of the subcommittees of the Academic Planning Committee, then reviewed and revised by the Committee as a whole, and finally shared for comment with each School Dean. Prior to this publication, this document was also sent for comment to the members of the Faculty Senate Executive Committee, the Undergraduate Assembly Steering Committee, and the executive committee of the Graduate and Professional Students Association.

We believe the result is an accurate and exciting summary of the strengths, concerns, and prospects of each of our Schools, reflecting both their individual characteristics and their sense of interconnection.

# Undergraduate/Graduate Schools

## Arts and Sciences

The history of Arts and Sciences at Penn is in many ways the history of the University itself, beginning in June 1755 with the charter that established a College for "the instruction, improvement and education of youth in any kind of literature, arts and sciences." This College of Philadelphia became, in 1779, the first American university.

By 1882, the University, with an enrollment of 1,000 students, first established its Graduate School of Arts and Sciences, where advanced students could pursue a course leading to the Doctor of Philosophy. A prime force in this development was then-Provost William Pepper, who perceived the "essence of a University" as "a breadth of view embodied in its organization which makes it keep in touch with all the intellectual needs of the people, an atmosphere of freedom which encourages individuality and original thought."

In the spring of 1974, the separate inheritors of this tradition came together as the School of Arts and Sciences—28 departments, 33 graduate groups, just over 500 faculty with their primary appointments in Arts and Sciences departments, 5,500 undergraduates, 2500 graduate students, and a budget of \$42 million. The creation of a unified School of Arts and Sciences was itself an answer to the challenge raised in the 1950s by the *Educational Survey* when it observed:

A liberal arts college within a university, surrounded by graduate and professional schools, runs the risk of being neglected. This is definitely the case at the University of Pennsylvania, and the situation is aggravated by the existence of the Wharton School with an enrollment equal to the combined enrollments of the College and the College for Women. The students of liberal arts are submerged by a great wave of professionals.

Yet the climate of the 1970s proved a difficult one in which to make new investments in the arts and sciences. The increasing vocationalism of both students and donors, shifts in federal research funding that often favored other Schools at Arts and Sciences' expense, and a national decline in the demand for Ph.D.s produced an environment in which liberal arts schools everywhere made their first priorities the preservation of strength and the maintenance of faculty size. In terms of these measures, Arts and Sciences at Penn fared well. Senior scholars were recruited to the School's key departments, and in one, Biology, major investments were made in both new faculty and renovated facilities.

The principal goal facing the new School of Arts and Sciences in the 1970s was establishing a unified faculty that could speak together as a vital part of the University. The challenge it faces in this decade is to develop a set of plans that clearly establishes the School's priorities for the balance of this century. This process has now begun.

Currently, many of Arts and Sciences' departments are distinguished by their excellence, both in terms of research and teaching efforts. For the most part, even in the face of pressing difficulties, the School's programs have remained academically robust.

While decisions in regard to the relative size of its departments and programs still remain to be made, the School has developed a planning strategy for maintaining and enhancing the faculty. The School's first priority is to maintain or enhance already excellent departments. Its second priority is to improve those departments that have nearly achieved excellence. Its third is to identify any essential departments that are threatened with mediocrity and to develop plans to rescue them.

The broad question the School must continue to ask as it builds its plan is: Where should Arts and Sciences invest scarce resources in order to bring the greatest academic return?

### Research Priorities

The disciplines of the arts and sciences provide access to the educated life and also create the theoretical bases for the professions. Arts and Sciences' faculty, largely through a discipline-based departmental organization, perform the intellectual tasks from which a substantial part of the definition, identity, and quality of the University as a whole is derived.

The School of Arts and Sciences' research priorities reflect its general strategy of balancing disciplinary strength by selective investments in collaborative research. The School is especially strong in the humanities. Of the ten Penn humanities programs rated by the National Research Council in 1982, five ranked in the nation's top ten, and nine ranked sixteenth or better in their respective fields in terms of faculty quality. Scholarship in this area primarily requires maintenance of excellent library facilities, funds for travel and leaves, and access to word-processing and other support services. The School has established several collaborative research projects in the humanities, such as the Philadelphia Center for Early American History. It is currently forging a proposal for a Center for Computer-assisted Textual Analysis, the outgrowth of two separate projects dealing with linguistic and textual materials.

Penn also has considerable strength in the social sciences, in which two Arts and Sciences departments are ranked in the top ten nationally and a third ranks twelfth. Here the research effort is reinforced by the activities of such organizations as the Center for Analytical Research in Economics and Social Science, the Center for Family and Household Behavior, the Population Studies Center, the Center for History of Chemistry, and the University Museum.

The natural sciences rank from very strong to relatively weak, the latter generally being a function of small departmental size. The Psychology department ranks among the very best in the nation. While federal funds will continue to be the major source of research support in the natural sciences, funding from industry will prove increasingly important. The natural science departments have formed an association to

stimulate joint ventures linking Penn with industrial, scientific, and technological communities.

The School of Arts and Sciences offers not only strong disciplinary programs but also a wide variety of interdisciplinary and interschool programs. Three current programs exemplify the kinds of connections that can be built.

- *Cognitive Science*. Supported by the Sloan Foundation, the program involves scholars from Psychology, Computer Science, Linguistics, Philosophy, Biology, and Anthropology in research in cognition, language acquisition, and artificial intelligence.
- *Social Science Seminars*. Supported by the Mellon Foundation, these five seminars bring together faculty from seven Penn Schools as well as from seven other universities to discuss the changing bases of social group identity and action; the diversity of language and the structure of power; the future of declining cities; technology and culture; and human nature.
- *Center for Plant Sciences*. An integral part of the new Mudd Plant Sciences Building, this developing center for interdisciplinary research will take advantage of the joint strengths of the Department of Biology and the School of Medicine.

### Priorities in Undergraduate Education

The School of Arts and Sciences teaches more undergraduates than do all the other Schools combined. It is crucial that it be able to give students an education that will have abiding value in their lives and enable them to fulfill their professional goals. Through its faculty, curriculum, and requirements, Arts and Sciences offers a rich and varied undergraduate education that allows for flexibility and individualization.

Independent study and research, senior seminars, faculty colloquia, freshman seminars, internships and field work, individualized study, dual degrees, dual majors, submatriculation, the General Honors program, the University Scholars program—all provide opportunities for students to interact with faculty members and to structure their own academic programs. They also offer opportunities for participation in courses and programs that cut across various disciplines and Schools of the University.

One of the first achievements of the School of Arts and Sciences was to establish a unified set of requirements, integrating the previously separate programs of the College and the College for Women. As the School itself has stated, the challenge now before it is to define and articulate its educational goals and “to explore and recommend ways of providing an imaginative and sound curriculum of undergraduate liberal studies that will better integrate the major program with the program in general education.” To this end, two School of Arts and Sciences committees are considering a number of carefully designed courses to replace the sometimes unrelated courses that currently satisfy the general education (distribution) requirements, and the School has begun asking each department and interdisciplinary program to re-examine and to reformulate its major as appropriate. The School has established the Writing Across the University program, and is building on its considerable strength in languages through such means as the establishment of language proficiency standards and the development of ongoing seminars to prepare graduate students for the teaching of introductory courses. In 1983, Arts and Sciences established a permanent Academic Development Fund, an important precursor of the Undergraduate Education Fund initiated by the President in “Investing in Penn’s Future.” In the School, as in the University as a whole, the purpose of such a fund is “to encourage the development of integrative and interdisciplinary courses and extracurricular activities that enrich the intellectual and cultural life of undergraduates.”

### Concerns

The University’s principal concern is to maintain the School of Arts and Sciences’ ability to compete for

- faculty, by making salaries commensurate with peer institutions, providing research support, and ensuring the School the ability to make key academic appointments;

- undergraduate students, by drawing on the rich traditions of the liberal arts as well as on Penn’s comparative advantages; and
- graduate students, by ensuring adequate fellowships, strong disciplinary programs centered in departments with national reputations for scholarship, and coherent programs of study that provide sufficient opportunities for both teaching and research.

It is also essential that the School achieve a balance between its plans, its priorities, and its own resources. It is not often understood that University support for Arts and Sciences has increased substantially over the last five years. Subvention to the School—including nearly \$1.1 million in new support for graduate fellowships and substantial allotments from the University’s salary reserve—has increased from \$8 million in 1981 to \$14.1 million in 1985. Arts and Sciences’ share of the University’s subvention to the Schools increased just this year from 45.7 percent to 47.5 percent. The University will continue its strong support for the School from unrestricted funds; the School’s own efforts to earn additional income will also be essential.

Arts and Sciences has also benefited from a series of major gifts that have provided an important operating income to the School. Foremost among these was the \$4.8 million grant from the Pew Memorial Trust, which allows the School to appoint faculty now to replace senior faculty scheduled to retire in the 1990s. The Mellon Foundation has provided Arts and Sciences some \$1.4 million to support the Social Science Seminars. Altogether, the School has received more than \$20.3 million in gifts over the last five years, more than in any comparable period in its history. Despite these external contributions, many of its departments are experiencing continuing erosion of discretionary funds and difficulty in finding sufficient resources for the hiring of new faculty. To a great extent, this can be remedied by further School and department efforts to increase and reallocate income.

Finally, it is vitally important that the School provide intellectual leadership in helping the University fulfill its commitment to undergraduate education. A fundamental role of Arts and Sciences is to establish a coherent definition of the undergraduate liberal arts experience. Efforts toward this end present special opportunities that can be explored by the School’s new Dean, and will be firmly supported by the University.

### Prospects

The new Dean of the School must assess alternate means of organization and determine which is most beneficial to the School. Only when stable leadership is ensured can the School complete the planning process that it began three years ago. The pressing challenge it will then face will be to recast its priorities in terms of a coherent and feasible plan. Planning to date has not successfully addressed the whole range of the School’s concerns. It is particularly important to strike an appropriate balance between scholarly strengths and the long-term instructional interests of students.

The size of its faculty will be determined primarily by the School itself. As in the past, Arts and Sciences can count on moderate increases in University subvention; however, these will not be sufficient to meet the full demands of its plan. Thus, in part, the scale of Arts and Sciences will be a function of its ability to earn additional tuition income, either by establishing new Master’s level graduate programs or expanding graduate Ph.D. programs, as well as by increasing external support— attracting both more research grants and gifts. The School’s scale will also be determined according to how much of its unrestricted budget it chooses to commit to standing faculty salaries. As the School has suggested, now may be the time to give individual departments greater opportunity to make tradeoffs between space and standing faculty appointments, or between part-time faculty positions and support for graduate students. The School of Arts and Sciences can and should grow stronger under the leadership of a new Dean working in close collaboration with the department chairs and other faculty members.

The strength and reputation of the University as a whole is inherently linked to the success of Arts and Sciences. As the heart of the University, the School of Arts and Sciences must both draw upon and benefit from the entire institution.



# Engineering and Applied Science

This School was one of the first units of the University to develop a detailed five-year plan for the 1980s. That plan built on the achievements of the 1970s, when four schools were organized to form a single School of Engineering and Applied Science comprising eight departments, which then established a growing reputation for undergraduate education and innovative interdisciplinary research. The revitalization of the School's undergraduate program has been particularly impressive. Full-time enrollment tripled from 409 in 1975 to 1,341 in 1984, when Engineering and Applied Science graduated the largest senior class in its history. More important, academic quality has improved by every measure. By 1980, the School was competing for the highest caliber engineering undergraduates in the country. In research, too, the achievements have been noteworthy. Research income increased 55 percent over the past decade, and the School presently ranks sixth in per capita research among engineering schools nation-wide.

It was to preserve and enhance these successes that Engineering and Applied Science developed its plan for the 1980s, which in many ways foreshadowed the University's current efforts by placing primary emphasis upon undergraduate education and research excellence. The plan's objectives are clearly stated:

We shall remain a selective engineering school in a private university, offering high quality programs and capitalizing on our ability to be experimental in the development of new programs. We shall continue to provide customized education for engineering students as well as for non-engineering students who seek a technological component in their education. And we shall focus our research efforts in key areas of societal need, with emphasis on increased interdisciplinary cooperation.

Two specific objectives framed the School's programmatic strategy: to strengthen its disciplinary core program; and to develop academic excellence and national leadership in specific fields in which the School and the University uniquely excel.

## Research Priorities

Drawing on this framework, the School has identified four priority areas that collectively define its principal intellectual thrust for the 1980s.

- **Bioengineering.** This discipline emphasizes the study of life processes utilizing the concepts and methods developed in the physical and engineering sciences. It involves the cooperative efforts of the biomedical and engineering communities. Basic goals of bioengineering research and education are the better understanding and modeling of living systems for application to the technological aspects of health care delivery.
- **Computer Science.** The scope of efforts in this area includes not only the enhancement of the School's core program in Computer and Information Science (including analysis of algorithms, theory of computation, programming languages, and architecture), but also the augmentation of interdisciplinary activities in fields such as cognitive science. These dual goals will be realized by focusing on selected major research areas such as artificial intelligence—especially computer vision/graphics, natural language processing, robotics, automatic reasoning and software systems, expert systems—and distributed architecture and systems.
- **Sensor and Response Systems for Bioscience and Industry.** This effort draws together faculty and graduate students from the School of Engineering and other University departments in research applying new technologies to the classic problems of sensory and response systems. The effort's uniqueness lies in its relevance to both traditional fields like chemical, electrical, and mechanical engineering and newer areas such as bioengineering, systems, and materials science. Topics of study range from creating sensing devices through multidimensional, multivariate information processing and imaging, to integrated visual-tactile sensing and processing systems.
- **Management and Technology.** Given the growing need for liberally educated managers of technological enterprise, Engineering and Applied Science joins with the Wharton School to offer a program in Management and Technology that provides comprehensive academic and research experiences at both the undergraduate and graduate levels.

## Priorities in Undergraduate Education

The School of Engineering and Applied Science's plan calls for two modest shifts in its own undergraduate program. First, it intends to increase both the number and proportion of students in its Applied Science program. The best mix, the School believes, is an 80/20 balance between Engineering and Applied Science, the latter of which combines a strong liberal arts foundation with a concentration in technology. At the same time, the School seeks to develop focused programs within the Applied Science curriculum, expand its dual degree and other cooperative programs, and broaden the general University experience in technological literacy by developing, for instance, minors in technology for non-engineering majors. Two examples of the efforts to be stressed in coming years are: the successful Management and Technology program, operated jointly by Engineering and Applied Science and Wharton, through which students earn one of two Engineering degrees (the Bachelor of Applied Science or the Bachelor of Science in Engineering) along with a Bachelor of Science in Economics; and the recently initiated undergraduate major in Computer and Cognitive Sciences, an interdisciplinary program that combines a Bachelor of Arts degree in Linguistics, Psychology, or Philosophy with a baccalaureate degree in Computer Science and Engineering or Applied Science.

## Concerns

Taken as a whole, the School of Engineering and Applied Science's plan calls for an ambitious extension of the School's current strengths and opportunities, leading to increases in number of students, faculty, and facilities. Because it is a bold plan, the School has recognized its inherent risks, particularly in regard to three key issues: student supply, finances, and the adequacy of investment capital for new faculty and facilities.

While, historically, trends in engineering enrollment have followed a cyclical pattern, engineering may prove an increasingly attractive career option for high school students as technology comes to play a larger role in society. Still, even more than in the past, the School must intensify its recruiting process in order to sustain its comparative advantage.

Because of industry's great demand for baccalaureate engineering graduates, the problem of attracting well-qualified applicants to graduate engineering is affecting universities nationwide. At Penn, the recently awarded \$7.7 million grant from the U.S. Army Research Office and the \$3.8 million grant from NSF for experimental computing facilities, among others, will fully fund the research of over 100 doctoral fellows for the next several years, including providing appropriate research equipment. Other sources of graduate support, however, remain problematic—dependent in large part on the faculty's ability to win a major share of what may prove a dwindling pool of federal research dollars. The faculty's record in this competition so far has been impressive—during the past decade, real growth in research income measured 37 percent.

Like the University as a whole, the School has become increasingly tuition-dependent, which presents a growing concern. The School's need to enhance faculty salaries, coupled with its investments in computing and high-tech laboratory facilities, now seriously strain its resources, raising the possibility of a deficit. With a leveling of enrollments the School must clearly look to new, largely external funding to support its future development.

Regarding its intent to gain this support, the School itself recognizes that "obvious risks are involved in predicating our plan on [a] . . . major campaign. However," it points out, "our peers are taking these risks, in most cases, without taking concomitant care to develop long-range strategies nor waiting to develop the funds a priori." In October, 1983, the University, through the Board of Trustees, approved a major development campaign that, if successful, will raise \$35 million, the bulk of which will be earmarked for new facilities. In the first half of FY 1985, that campaign generated pledges and gifts totalling \$3.2 million.

## Prospects

The strength of the School's planning lies in its adaptability to changing circumstances and opportunities. In the past few years, for example, it has broadened its strategic objectives by winning one of the two U.S. Army Research Office grants for artificial intelligence education and research. Engineering and Applied Science has also been able to fund from its operating budget some rehabilitation of current facilities. The School may continue to expand modestly over the next decade. The pace and scale of that expansion, however, must necessarily depend on the success of its campaign and its ability to raise major research funds. It is anticipated that in the next five years there will be a modest increase in the School's undergraduate enrollment as planned, through expansion of its joint programs, particularly those in conjunction with the School of Arts and Sciences. The total number of undergraduate students with a principal affiliation in Engineering is projected to increase in the next five years by about 15 percent.

## Nursing

This fall, the School of Nursing will begin the celebration of its fiftieth anniversary, marking its new standing as one of the nation's leading nursing institutions. Achieving this position involved rebuilding the School's pool of qualified undergraduate applicants, establishing a doctoral program in nursing, launching a coordinated program of faculty research, and winning more than \$9 million in external support over the last five years. It also involved recruiting fifteen new members of the standing faculty, including a Dean who has provided imaginative and resourceful leadership to a School that merits careful nurturing.

The School's mission is to lead the discipline of nursing, by developing and strengthening the knowledge base for nursing practice through research, and by providing baccalaureate and graduate programs of excellent quality. Implicit to this mission is the identification of, and response to, society's long-term nursing needs.

In developing its plans for the 1980s, the School of Nursing established its intellectual directions in terms of curricula that will emphasize care and management of the chronically ill and the elderly, and the teaching of skilled practice and newly developed theories of patient care to accompany the development of new technology and new drugs. In the interest of cost effective quality care, the curricula will continue to recognize the current and future needs for expanding nursing practice in both the community and institutional settings; and it will emphasize at all levels improved management and administrative skills.

An important avenue for achieving these educational goals at both the graduate and undergraduate levels is in the evolving partnership between the faculty of the School and the nursing staff of the Hospital of the University of Pennsylvania (HUP). This partnership provides for an increasingly close relationship among teaching, practice, and research by emphasizing the primary research role of the School, the primary practice role of the Hospital, and the shared educational role of each. Finally, the School recognizes its need to develop new strengths in the area of nursing and health policy, having made the raising of endowment funds for an interdisciplinary chair in this area a principal development goal.

### Research Priorities

The University requires a school of nursing distinguished by its capacity for research. On any comparative basis among schools of nursing, Penn's School has made significant progress towards that goal. The scholarly productivity of the faculty has increased; the number of externally funded studies has grown from none in 1979 to twenty in 1985. Funded research studies are expected to increase to 33 in the next five years. It is also anticipated that the size of the grants will increase substantially as the faculty moves from obtaining seed money to major awards. This growth is the result of the concentrated efforts of the

The School's decision to concentrate its research investments in the interdisciplinary areas of bioengineering, computer and cognitive sciences, management and technology, and sensor and response systems is an application of the larger University policy of priority investments in research excellence. All of these areas involve interaction with other Schools of the University.

To complement these efforts, the University is committed to fund-raising for refurbishing Hayden Hall and building a new wing that will house the Computer and Cognitive Sciences Program. These are necessarily first steps, but they represent a major commitment of scarce central resources that must be matched by the School, either through reallocations or new external support. At the same time, the School will continue to play its vital role as a major innovator in undergraduate education and as a spur to other Schools in their attempts to establish strong links among complementary programs.

School's administration, the recruitment of new faculty, and the fostering of an institutional environment that is supportive of research.

The most visible symbol of these changes is the School's recently established Center for Nursing Research. This Center, which now receives substantial external funding, both awards faculty small research grants and provides them with technical advice, statistical and secretarial support, and workshops on grant writing and experimental design.

The Center for Nursing Research is also responsible for the Robert Wood Johnson Clinical Nurse Scholars Program, a cooperative venture of the Schools of Nursing and Medicine and the Hospital of the University of Pennsylvania—one of three such programs in the nation. The purpose of this program is to provide two years of clinical experience in practice and research for nurses with doctorates. Each of the three Nursing Scholars has a preceptor team consisting of a nurse faculty member and a physician faculty member (both with research experience), as well as a nurse clinician from HUP. At the end of the two-year fellowship, the Scholars should be confident nurse clinicians, with manuscripts based on their fellowship research experience submitted for publication, and with grant applications on the next phase of their studies prepared for submission upon return to their home institutions. A further benefit of this program has been its contribution to the overall increase in faculty research productivity.

### Priorities in Undergraduate Education

Planning for the School of Nursing's undergraduate programs has sought both to broaden the scope of the School's programs designed for its own students and to make its general programs more attractive to undergraduates and others from across the University. The School's faculty are continuing their review of the Nursing curriculum with the aims of increasing flexibility, making the understanding and application of technology an integral part of the curriculum, and creating more opportunities for students to pursue selected areas of study, earn dual degrees, and participate in faculty research. This process involves a review of the School's own distributional requirements. At the same time the School is planning to expand and make available to all Penn undergraduates clusters of courses in ethics, nutrition, and aging.

In practical terms, the undergraduate curriculum will continue to emphasize a strong liberal arts and sciences foundation. The professional component of the baccalaureate degree will build on this foundation to define and develop solutions to problems of health care, from the perspectives of both the individual client and the health care system as a whole. Because additional populations at risk are placing new demands on that system, the undergraduate curriculum will devote increasing attention to the ethical and legal aspects of care, health care economics, health policy, and computer information systems technologies.



## Concerns

The exemplary management of the School of Nursing effectively controls expenses, makes sustained investments, and regularly develops new sources of income. The problems the School faces are largely endemic to the field of nursing itself. The foremost of these concerns regards the ability of a high-cost, selective school of nursing to compete effectively in a market dominated by lower-cost, public programs. Much of the decline in the School's full-time Master's program enrollments over the last several years is directly attributable to the lack of financial aid. While Master's FTE's have been maintained through increases in part-time enrollment, these students cannot fully participate in University life. The School's ability to enhance the quality and size of its undergraduate applicant pool has been linked in part to the availability of advantageous financial aid packages for these students. While the current ratio of grant aid to self-help in the School of Nursing is above average compared to Penn's other undergraduate Schools, it is dependent on continuing student financial aid funds, both general and specific, from the federal government. A substantial diminution of these funds would seriously threaten the School's capacity to maintain the scale and quality of its undergraduate programs.

The further development of the School of Nursing's educational and research programs depends on its increased interaction with other University resources. This would involve, for example, encouraging undergraduate students to take more courses outside the School, finding other methods for student participation in diverse learning activities throughout the University, and involving even more senior research faculty from other parts of the University on the dissertation committees of

doctoral candidates. The School of Nursing currently offers secondary appointments to senior faculty associated with Penn's other health and professional Schools—a built-in mechanism for interdisciplinary participation in the review of the Nursing curriculum as well as in the teaching of new courses.

Finally, there are major concerns regarding faculty salaries and space. The School must be able to maintain the continued real growth of faculty salaries through both unrestricted and restricted resources. The growth in faculty size and research has created unresolved space shortages for offices and research both in the Nursing Education Building and the clinical areas.

## Prospects

The School of Nursing is completing a decade of extraordinary growth and accomplishment. It has proved it can stimulate faculty research, matriculate a well-qualified undergraduate student body, and build cooperative programs with other components of the University, including the Wharton School, the School of Medicine, and the Hospital of the University of Pennsylvania. The challenges for the next decade are in consolidating these institutional gains and maintaining the School's position of leadership.

Societal changes and technological advances taking place in the next decade will alter the delivery of health care in the United States and will have a direct impact on nursing. Situated at Penn, the School of Nursing is well positioned to determine not only its own future, but the future of the nursing profession as well.

# Wharton

Wharton is one of the nation's premier schools of management. Its reputation derives from its commitment both to scholarship and to the education of future management leaders, with strong curricular emphasis on functional training and analytical approaches. At the same time, the School is a major contributor to, and shaper of, the University's national and international standing. Its degree programs attract some of the best students and faculty. The research done within the School is widely used and quoted, and its education and research programs are important sources of revenue for both the University and the School. In many ways, Wharton exemplifies the strength an individual School can draw from its interaction with other Schools and departments, particularly through interdisciplinary and inter-School teaching programs, joint degrees, and shared research activities.

The School's primary goal is to proceed from a position of prominence among schools of management to one of pre-eminence. To do so, it must continue to build and strengthen its undergraduate and M.B.A. programs, bring new distinction to its Ph.D. programs, and maintain and expand its research base. Wharton now also plans to complement these activities with a major investment in executive education, by developing an interactive educational program involving the School's faculty, research centers, and alumni as well as other campus resources. Executive education represents a third component in the education of Wharton students, supplementing their earlier undergraduate and graduate experiences.

## Research Priorities

Wharton is an undisputed leader among management schools in the field of sponsored research. The quality and volume of the School's research activity has become one of its defining characteristics. What the School sees as being most important about the activities of its 28 research centers and programs is their impact upon the academic, government, and business communities. In these terms, Wharton is successful, whether its success is judged by the opinions of its peers or by quantitative measures such as citation indices.

Wharton's research priorities revolve in part around its commitment

to the value of interdisciplinary activity. As the School's five-year plan states:

As organizations and the larger society in which they operate grow ever more complex, the need for the varying perspectives and insights deriving from a broadened disciplinary viewpoint will increase as well. . . . Joint programs are a great source of strength for the School and for the University as a whole. In its commitment to develop such mutually rewarding endeavors, the School clearly reflects the "One University" concept that fosters interaction between disciplines.

Wharton centers and programs address issues in a wide range of subject areas and draw on the diverse faculty from the Wharton School itself as well as from other University departments. Centers operated in cooperation with other University Schools include the Center for Studies in Criminology and Criminal Law; the Center for the Study of Organizational Innovation, a joint effort between Wharton and the School of Arts and Sciences' department of Economics; the Leonard Davis Institute of Health Economics, which serves as the University-wide center for health management and policy in such diverse fields as economics, medicine, sociology, decision sciences, management, dentistry, and law. Some examples of other centers are: the Busch Center, devoted to the study of large-scale social systems; the Reginald Jones Center for Management Policy Strategy and Organization; and the Fishman-Davidson Center for the Study of the Service Sector.

The number of candidates for Wharton doctorates has grown significantly. Many of these candidates are foreign nationals, and while this mix contributes to an internationalized educational experience, the School will seek to increase the proportion of students from the United States. Wharton plans to integrate its research programs more effectively; one result, it believes, will be increased financial and academic support for its doctoral programs. In turn, it expects improvements in its doctoral programs to enhance the School's research activities.

The first phase of Wharton's five-year plan for computerization is well underway. One major objective of the plan involves the extensive integration of microcomputers into the work of faculty and students as

well as administrators and support staff. The School anticipates that its research capabilities will be greatly enhanced as its computerization plan is implemented, and a coordinated University-wide data access system is developed.

### Priorities in Undergraduate Education

As this nation's top-ranked undergraduate business school, Wharton attracts a diverse and talented student body. Its program offers a focused undergraduate major and combines a liberal arts foundation and management education. Despite the prospect of a nation-wide downward trend in undergraduate enrollments over the next decade, Wharton should be able to maintain a highly qualified applicant pool, particularly if the School continues to market its programs broadly. At the same time, Wharton plays a critical role in ensuring the overall quality and reputation of the Penn undergraduate experience. More than a third of the enrollments in Wharton courses are from outside the School. It is essential that Wharton maintain the distinctive quality of its undergraduate program.

Currently, more than 340 students are earning dual degrees from Wharton and the School of Engineering and Applied Science or the College. The Management and Technology Program, which offers a Bachelor of Science degree from Wharton and Engineering and Applied Science, is one example of a successful, ongoing joint degree option. Other similar programs are being considered. Wharton may also offer minors for students from other Schools with appropriate backgrounds.

The next five years will largely involve consolidation and enrichment throughout the Wharton curriculum. During this period the number of undergraduate matriculants is expected to remain constant. The focus of the School's teaching and research is in providing fundamental grounding in management concepts and practice in order to educate the business leaders of the future. Wharton believes strongly in the involvement of both faculty and students in real-life problems as well as in scholarly pursuits. A key aspect of the School's executive education program is that it can provide undergraduates an association with Wharton that will persist throughout their careers, thus increasing the School's attractiveness to prospective students and ensuring its continued access to major figures of the business world.

### Concerns

All Schools, even the most successful, face a potentially troubled future given changing attitudes towards higher education in general, and the high cost of undergraduate education in particular. Wharton is correct when it argues that for at least the next five years the depth of its applicant pool will allow it to maintain its current scale with little or no decline in the overall quality of the student body. The School has reason to be optimistic about its long-term prospects as well—though it is helpful to remember that as recently as 1968 there was concern about Wharton's ability to matriculate a freshman class of the same standard of quality as the College. The way to guard against history repeating itself, as the School itself has stated, is to continue to make undergraduate education a high priority, ensuring that Wharton's best faculty are

directly engaged in the provision of a quality education. In particular, it is important that the School increase the commitment of its standing faculty to undergraduate programs.

Concerns regarding the future of the M.B.A. program follow a similar pattern. Already, many observers are noting the maturity of the M.B.A. market and, as a consequence, a national levelling-off of enrollments as well as starting salaries offered to newly graduated M.B.A.s. Although the School has experienced neither of these trends, it has recognized the national problem and understands the need to maintain the strength of current programs without any increase in scale.

It is natural, therefore, for the School to seek a new target of opportunity for its considerable energies and willingness to innovate. The choice of development in executive education is an exciting one, drawing as it does on the strength of the School's current programs and the loyalty of its alumni at both the graduate and undergraduate levels. Yet in pursuing this initiative there are financial risks as well, including those surrounding the plan to invest more than \$18 million in a facility capable of providing the quality experience an inherently expensive program demands.

Less obvious are the risks associated with asking a relatively small faculty to take on increased burdens. Can the Wharton faculty develop a first-rate program of continuing education while simultaneously maintaining its undergraduate and graduate programs and its current levels of sponsored research? Can it do this without seriously straining its resources and without developing a separate executive education faculty? Neither the School nor the University would want to compromise one strength to develop another.

### Prospects

It appears that in coming years the Wharton School will be able to consolidate its already strong position in the field of business education. Its undergraduate experience, based both in management studies and in the liberal arts, should continue to be attractive to the very best students, particularly as the School augments its efforts in the areas of international business, computer skills, human resource development, and the interactions among businesses, government, and society. Wharton will continue to support joint degree programs with other Schools within the University; it also will examine the possibility of extending these programs to include minors for students from other Schools.

The School will expand its research activities by recruiting faculty with strong research interests. It has already initiated a review of its Ph.D. programs with the aim of strengthening their research content, and is increasing fellowship support for promising graduate students.

In the professional area, Wharton will further enhance its M.B.A. degree program and round out its offerings by developing an executive education program that draws upon the strengths of the University at large as well as those of its own faculty. Wharton thus envisages a future in which the School both benefits from and contributes to Penn's continuing development as a university in which the professions and the liberal arts work together.

# Medical Science Schools

## Dental Medicine

No School of the University faces a more dramatic enrollment problem, and none has addressed it more directly, than the School of Dental Medicine. Nationally, the number of students seeking a dental education has dropped by half, falling from just over 14,000 in 1976 to less than 7,000 in 1984. While the overall number of SAT takers remained relatively constant between 1975 and 1982, those citing dentistry as their "first choice" career decreased by 20 percent. Data from the College Board suggest, moreover, that the decline in applications is likely to continue well into the 1990s. Despite these trends, dental schools nationally have reduced first-year enrollments by only 12 percent. It is estimated that unless more dental schools reduce their enrollments, or a certain proportion close their doors entirely, student places will begin to outnumber applications. Thus, the prospect is for greatly increased competition for an increasingly smaller pool of qualified applicants.

Recognizing these trends, the University of Pennsylvania's School of Dental Medicine began a long-range planning process in 1975 that had three stated goals:

- to preserve and strengthen the School's research programs;
- to maintain the excellence of its graduate program in advanced dental education (DADE);
- to reduce the number of D.M.D. students from 640 to 240 while simultaneously introducing a new curriculum that would stress the training of generalists in an environment that replicates the actual practice of dentistry as closely as possible.

In 1977, it stated its commitment to a fundamentally different kind of dental education.

The School is committed to achieving the maximum "oral fitness" for the greatest number of citizens, children and adults, through prevention, treatment, and research. Successful dental practice arrangements in the future will involve highly competent generalists, dental specialists, and auxiliary dental therapists, functioning in complementary roles. . . . University practice models for faculty and students will be adapted to meet the needs of the educational programs of the School, with the view of creating practice settings most ideal for the training of future practitioners.

In the process, the School set for itself the most difficult of challenges: to get better while growing smaller. With the help of the University's Higher Education Finance Research Institute, the Busch Center, and a major grant from the Pew Trust, the School began experimentally introducing its new curriculum while developing and implementing the agreed-upon reductions in students, faculty, and staff. In the fall of 1984 the School of Dental Medicine had 88 first year students, a total of 380 students in the second, third, and fourth years, 67 standing faculty, 231 part-time faculty, and 208 staff—a reduction from 639 D.M.D. students, 99 standing faculty, 272 part-time faculty, and 220 staff in the fall of 1979. Implementation of the new curriculum also led to extensive changes in physical facilities, including major renovations to the main clinic and conversion of a lecture hall to provide additional clinical space.

### Research Priorities

In the fall of 1983, the focus of the School's planning began to shift from the D.M.D. curriculum to the School's research programs. Historically, much of the School's national reputation has derived from the importance it has placed on basic and clinical research.

Most of the research activities of the Dental School Faculty are integrally related to the three research centers located at the School. Each of these is complementary and characterized by the integration of efforts of both basic and clinical science researchers. First, the Center for Oral Health Research (COHR), one of five Centers of its kind funded by the National Institute of Health, focuses on fundamental research in biological processes that are pertinent to the diagnosis and treatment of dental diseases. Here scholars are involved in research that addresses basic problems in disciplines such as molecular biology, microbiology, immunology, and virology. Next, the General Clinical Research Center (GCRC) deals with research that can be directly applied to patients. Faculty investigate such problems as the comparative effectiveness of new health products or treatments for dental disease. Finally, the recently approved (but not yet funded) Periodontal Research Center blends both of the above approaches by focusing the talents and expertise of both basic and clinical science researchers on a specific clinical problem, namely Juvenile Periodontitis, a form of rapidly spreading gum disease that affects teenagers and adolescents.

### Priorities in Undergraduate Education

In 1982 the School of Dental Medicine began a joint program with the College of Arts and Sciences at Penn. This program allows students to earn both B.S. and D.M.D. degrees in six years. The School now believes, however, that by implementing the following two initiatives it can contribute more substantially and directly to the undergraduate curriculum. First, it will encourage some senior faculty in the basic sciences to develop secondary appointments with departments offering undergraduate instruction. The School will then make these faculty available for the teaching of undergraduate courses. Second, the School of Dental Medicine will develop a series of undergraduate research opportunities within its clinical and basic science departments.

### Concerns

Any School undergoing a substantial reduction in scale faces two fundamental challenges. One is to preserve its academic excellence and its intellectual enthusiasm for new opportunities. No matter how often faculty and staff are reminded that "small can be beautiful," they know that a growing School, which can continuously recruit new faculty, will foster the sense of intellectual adventure that often distinguishes an institution of the first rank. Schools forced by circumstances to grow smaller, on the other hand, can easily lapse into a contagious contentiousness that, by further sapping the energies of the faculty, undercuts the school's national reputation and scholarly productivity.



The second challenge facing a contracting school is largely financial. No matter how carefully the school plans, income will decrease faster than expense, largely because a substantial portion of the school's budget is allocated for fixed costs. Reduction of the size of the student body without an equal reduction in the scale of the physical plant, for example, means that an increasing proportion of each remaining student's tuition must be used to maintain the school's instructional facilities. In dental education, unfortunately, the scale of the facility is largely a function of the size of the third- and fourth-year classes, in this case the last to be reduced in size. In 1984-85, for instance, the School of Dental Medicine's first-year class comprised 88 students and its fourth-year class included 164. Faculty costs follow a similar, though slightly more complicated, pattern. Problems lie not only in that the instructional costs of the fourth year are greater than those of the first, but also in that contraction causes a school's balance between standing and associated or part-time faculty to change.

These circumstances have made it necessary for the central administration to supplement its financial support for the School of Dental Medicine. The School itself has pledged to stand on its own by 1990, but that will be possible only if research support increases, faculty charge a greater proportion of their effort to their research grants, and the School moves its D.M.D. and DADE programs into substantially

smaller facilities. Ultimately, a shift out of the Evans Building seems essential.

## Prospects

At the halfway point in its planned contraction, the School of Dental Medicine has maintained its sense of purpose and optimism while strengthening its reputation as a school of national prominence. It has recruited as its Dean an internationally renowned scholar. While it is too soon to evaluate its investments in new research areas, the early signs are positive. For example, the School's proposal to the National Institute of Dental Research to establish a Periodontal Research Center was recently approved. This Center should be operational in 1986. In addition, Colgate Palmolive just awarded the School the first year of what is anticipated to be a five-year grant to investigate the role of microbial invasion in destructive periodontal disease. At the same time, the quality of the School's applicant pool has been maintained even though the need for financial aid and assistance has increased substantially. Unfortunately, the School's financial problems continue to prove extremely difficult. Still, the energy, initiative, and spirit that have marked the School's planning and implementation efforts to date provide sound reason for cautious optimism about the future.

# Medicine

The School of Medicine exemplifies the University's commitment to teaching, research, and service. Approximately 800 faculty (665 of whom belong to the standing faculty) currently teach 657 medical students, share in the teaching of over 270 graduate (Ph.D.) students, and, through their hospital affiliations, assist in the training of more than 1,240 residents and clinical fellows. Collectively, the School's research programs form an internationally acclaimed center for biomedical research, annually supported by more than \$60 million in grants and contracts. Finally, faculty in the School's clinical departments, through the Clinical Practices of the University of Pennsylvania (CPUP) and in conjunction with the Hospital of the University of Pennsylvania (HUP), together represent the Delaware Valley's largest combined provider of health care.

Over the last decade there has been a fundamental strengthening of the School along all three dimensions. The School has remained competitive for the very best students seeking careers in medicine and biomedical research. It has also increased the number of minority students in its entering class, from 7.3 percent in 1980-81 to 10 percent in 1984-85. The School has successfully recruited internationally known scholars to chair its key departments, while achieving 4.86 percent real growth in its research income. In FY 1982 (the last year for which data are available), the University of Pennsylvania and its principal affiliated institutions received the second largest share of National Institute of Health funding in the nation. At the same time, the Clinical Practices of the University of Pennsylvania, first established in 1976, provide both a stable patient flow to HUP and significant funding for academic programs to the School of Medicine.

## Research Priorities

A fundamental issue for the School, as for the University as a whole, is maintaining the proper balance among its separate functions, departments, centers, and institutes. As the School describes in its plan:

Departments will continue to be the major building blocks in the School's research programs. Since much current research is interdisciplinary in nature, the future program growth will require close cooperation among departments. One of the most successful ways to enhance the School's research enterprise is to encourage communication among the related research programs that already exist. Greater interaction between the basic science and clinical departments will be particularly beneficial.

Recognizing that no one school can address all areas of biomedical sci-

ence, the School of Medicine has identified eight research focuses for future emphasis:

- Biomedical Imaging
- Cancer
- Cardiovascular Disease
- Computer Technology
- Diabetes
- Immunology
- Molecular Genetics
- Neurosciences

The growth of academic programs within its clinical departments over the last decade, combined with a continued shortage of research space, calls for a major and counterbalancing investment in a new Clinical Research Facility. External reviews, along with the School's own planning process, have suggested that additional space may be required for the Departments of Dermatology, Medicine, Neurology, Obstetrics and Gynecology, Ophthalmology, Psychiatry, and Radiation Therapy as well as selected interdisciplinary efforts, such as those of the David Mahoney Institute of Neurological Sciences and the University of Pennsylvania Cancer Center.

Occupying more than a quarter of the Clinical Research Facility will be a new Howard Hughes Medical Institute, which will add ten to fifteen scientists to the School's faculty. The opportunity to serve as host to the Howard Hughes Medical Institute is both testament to the School's national standing and a critical, externally funded investment in the School's expansion.

The School is currently enhancing its role in graduate teaching by providing critical leadership for the task of reorganizing and redirecting the University's graduate programs in the biomedical sciences. In October 1984 a Director of Biomedical Graduate Studies was appointed to help strengthen the teaching program by providing a clearly identified central focus for the thirteen biomedical graduate groups, which include faculty from Medicine, Veterinary Medicine, Dental Medicine, Arts and Sciences, and Engineering and Applied Science. Coordinated admissions and recruitment mechanisms are being instituted to enhance the caliber of the student body. Priority will be given to the effective coordination of graduate teaching, including the identification of a core faculty primarily devoted to graduate teaching. Over the next years, courses in Cell Biology, Molecular Biology, Membrane Biology, Genetics, Immunology, and Computer Science will be developed for the

programs' first-year graduate students. Several graduate groups will contribute to the development of each course, thereby giving students direct access to the breadth of faculty expertise.

### Priorities in Undergraduate Education

Historically, the School of Medicine's contributions to undergraduate education have been principally centered in its faculty's individual initiatives in the teaching and supervision of undergraduate courses and independent study, and in its placement of undergraduates as laboratory assistants, often in conjunction with College Work Study. While these efforts will continue and increase, the School of Medicine is also developing three new initiatives in response to the University's establishment of undergraduate education as a top priority.

The first entails creating model programs for undergraduates interested in medical careers. These programs will allow students with special interests in the humanities, social sciences, physical sciences, or biological sciences to choose courses of study that will prepare them both to seek entrance to a school of medicine and to pursue scholarly knowledge in their special interest areas. Currently, faculty from the Schools of Medicine, Arts and Sciences, and Engineering are developing specific model programs.

In addition, working with the School of Engineering, the School of Medicine is forming a Medical Scholars Associate Program. Selected Engineering undergraduates who are interested in medicine as a career will regularly join medical students for a special seminar in which both interests are combined. Upon completing their undergraduate studies, Medical Scholars who have established outstanding records will be given special consideration as candidates for admission to the School of Medicine. Those who then matriculate will continue to hold the title of Medical Scholar and will be given the option of spending a fifth year in the School of Medicine to work on projects related to their engineering interests.

In response to the University's Faculty Council on Undergraduate Education, the School of Medicine is also developing a core learning experience principally for Arts and Sciences undergraduates entitled, *The Human Quest for Health*. The School of Medicine's Associate Dean for Academic Programs is now coordinating the development of this interdisciplinary learning experience with his counterparts in the Arts and Sciences.

### Concerns

For the School of Medicine the next decade promises both extraordinary opportunities and heightened risks. Over the last decade, the strengthening of the School has largely been the result of new program initiatives and strong leadership, facilitated by increases in both clinical and research income. For separate though not unrelated reasons, both of these revenue streams will, over the next years, come under increasing pressure from changes in federal policies and practices. Technological improvements, as well as basic changes in third-party reimbursements for hospital care, are everywhere reducing the average length of hospital stay and, accordingly, causing declining occupancy rates in most hospitals. Though HUP is one of the highest-ranking hospitals in the Delaware Valley in these terms, its average daily occupancy rate has fallen from 86.8 percent in 1982 to a current 79.4 percent. A natural response to this decline is to increase the number of admitting physicians. For HUP to do so, however, would require further expansion of

CPUP and a substantial increase in the ambulatory care facilities available to the Clinical Practices.

Is such an expansion prudent, particularly in view of the strong likelihood that third-party reimbursements for physicians' services will also be contained? Should the size of the School of Medicine's standing faculty, which includes clinician-educators, be determined by the needs of the University's Hospital? Is there a point at which the expansion of the clinician-educator track upsets the internal balance of the School itself?

Increases in research income may prove equally problematic. It seems inconceivable that the Congress will not insist that the nation maintain its pre-eminence in biological research in general, and in the new biologically-based technologies in particular. Still, funding the expansion of clinical research efforts will require the School of Medicine to gain an increasing share of available NIH funds when overall real growth of that funding pool is in question. The School of Medicine's long-range plan assumes that its research funding will increase, but recognizes the hazards of its commitment to an expanded research base.

The task before the School is enormous—to continue to develop and expand its reach while limiting financial risks and preserving balance among its principal missions of teaching, research, and clinical care. Special attention must be given to departments, particularly within the basic sciences, that now rely heavily on the Dean's discretionary funds. As the School's own plan states,

The School of Medicine continues in the current academic year to operate without a deficit, as it has for the past decade. Financial projections indicate that this is less likely to continue over the next years. The overall School projections mask significant problems in several of the School's departments. The Long Range Planning Committee's Subcommittee on Medical School Finance is working to develop long-term financial projection capability at the departmental levels.

### Prospects

Biomedical research and teaching at the University is an integral factor in Penn's international reputation. The next decade promises to be one of extraordinary discovery for the biological and biomedical disciplines; the growing revolution in these areas will affect styles and standards of living and will rival the transformation now being wrought by the introduction of new electronic technologies. The strength of the School of Medicine's faculty and the coherence of its separate programs, imaginatively reinforced through a planning process that has stressed careful review and systematic investment, provide opportunity for Penn to stand as an international leader in basic and clinical research. One of the challenges for the next decade is to enhance the integration of biomedical research efforts across the University. To ensure the proper climate and setting, the University has undertaken more than \$130 million in borrowings to renovate and modernize HUP. There is also a commitment to the new Clinical Research Facility. The precise scale of the facility and the extent to which it will represent additional, rather than substitute, space are still to be determined. Those decisions will reflect the School's and the University's best judgment on future funding and on the necessary increase in the size of the School's faculty.

The futures of the University and its School of Medicine are intertwined. The School's very size and complexity, and its overall importance to Penn, prescribe that each will move ahead only if their planning processes remain closely coordinated.

## Veterinary Medicine

The University of Pennsylvania's School of Veterinary Medicine has greatly influenced the national pattern of veterinary education in the last quarter-century. It was the first veterinary school to adopt the idea of medical-specialty education and to apply this concept broadly in relation to the care of animals. As a result, the School's faculty conduct basic and clinical research in great depth. This translates into close stu-

dent contact with leading research activity, and serves to enrich the curriculum as well.

This School plans to continue the present balanced program of education, research, and clinical activity on its two campuses. Although the applicant pool for schools of veterinary medicine has diminished, the quality of Penn's matriculants has been maintained despite the Univer-



sity's high tuition costs. The School's research activities are well-funded and are competitive at the national level. Its hospitals and clinics are busy and each year generate income in the \$6 million range. The School's mission is carefully stated in its 1983 five-year plan:

- to train a highly qualified body of general practitioners, appropriate numbers of specialists, and biomedical scientists equipped to meet society's present and future needs;
- to create new knowledge through fundamental and applied biomedical research, including behavioral research, with particular emphasis on diseases of domestic animals and on animal homologues of human disease through continuing development of the School as a center for comparative medicine;
- to develop and maintain facilities and systems for the delivery of veterinary medical services on a regional basis, especially sophisticated care not generally provided by veterinarians in private practice;
- to offer quality continuing education programs aimed at refreshing and advancing the knowledge and skills of practicing veterinarians;
- to broaden the contributions of veterinary medicine to society through the development of new disciplines and specialties, for example, aquatic veterinary medicine, veterinary social work, and advanced animal technician training programs.

Through its two hospitals, the School has continuous and vigorous contact with its various external constituencies. Within the University, it interacts with the School of Arts and Sciences, the School of Medicine, the School of Dental Medicine, the Wharton School, and the School of Social Work in a variety of ways. Students in the V.M.D. program, for example, may take some of their electives in other Schools of the University as part of the unique core-elective system now in place. Certain electives may even be taken in a number of institutions outside the University. It should be noted in this context that Penn's School of Veterinary Medicine was the first to offer the combined V.M.D.-Ph.D. degree, and its combined V.M.D.-M.B.A. program, offered in conjunction with the Wharton School, is the only one of its kind. In addition, it has been the only veterinary school in the country to receive NIH grants both for the V.M.D.-Ph.D. degree program and for student summer research.

### Research Priorities

The School is deeply committed to a broad range of basic and clinical research, the former in areas at the frontiers of knowledge, the latter in areas of particular importance to the improvement of animal health. At present, basic science emphases include molecular biology, immunology, and neurobiology. Recent projects have involved

- the introduction of new genes into animals: research aimed toward increasing farm animal productivity and resistance to disease;
- studies of interactions between hosts and parasites with particular emphasis on the antigens produced by parasites at various stages of their life cycles;
- research on the neural regulation of sleep and on ways in which disorders of sleep affect respiratory and cardiac function.

On the clinical side, there are ongoing high priority areas, such as the Leukemia Research Unit, research on metabolic disorders in dairy cows, research on the metabolism of retinol in sheep, and research on genetic diseases of cats and dogs with potential application to human homologues. In addition, the School has a continuing responsibility to respond to outbreaks of naturally occurring diseases among domestic animals. For instance, the avian influenza virus that last year affected large numbers of poultry was first diagnosed at Penn; the School of Veterinary Medicine worked closely with the Commonwealth and poultry farmers to contain and eradicate it. New research programs on John's Disease of cattle and Potomac Horse Fever also represent important clinical emphases.

An interesting new research priority with great potential is the examination of the interaction between domestic animals and their owners from the perspective of behavioral science. The Center for the Interac-

tion of Animals and Society, which has been essential in this effort, has served as a model for other Veterinary Schools. The School is also engaged in research concerning the fundamental mechanisms that control such basic behaviors as thirst, respiration, sleep, touch, and pain. The work is coordinated with basic research in the Department of Animal Biology.

The high priority now being placed on efforts toward renovating and modernizing its research facilities reflects the School's overall emphasis on research. Other evidence of this thrust is the first annual School-wide research symposium now being planned, at which twenty-seven faculty members will present their current research to representatives of over one hundred pharmaceutical companies. The School of Veterinary Medicine plans to maintain its strong commitment to research.

### Undergraduate Education

Although the School of Veterinary Medicine enrolls no undergraduates, it does contribute to the undergraduate experience in several ways. Members of the Veterinary faculty currently participate in undergraduate courses in comparative nutrition, astronomy, and anthropology; several Veterinary School faculty teach courses within the School of Arts and Sciences' Biological Basis of Behavior major. A number of undergraduate students work in veterinary research laboratories, others are engaged in independent studies in the School, and still others are involved in volunteer work at the School's two hospitals. Moreover, the Dean is encouraging increasing numbers of the School's faculty to take part in the Freshman Seminar and Honors programs.

The School does not have many other occasions to work with undergraduates; however, it will seize opportunities to do so as they arise and attempt to intensify its activity in this area.

### Concerns

One of the significant factors underlying the outstanding record of achievement of the School of Veterinary Medicine in the last three decades has been the financial support it has received from the Commonwealth of Pennsylvania. Successive state administrations and legislatures have given increased recognition to the importance of the School's role in support of agriculture generally and food-animal production in particular. In fact, the Commonwealth's funding of the Veterinary School for the year 1984-85 stood at roughly \$9.5 million, about 40 percent of the School's total budget for that year. While the University is grateful for the Commonwealth's commitment to the School, there remains some concern that sometime in the future a fiscal crisis could cause the Commonwealth to curtail its funding. The University expects, however, that the funds raised in the School's current development drive will provide the necessary support to maintain the School at approximately its present size.

The development campaign is also expected to provide major endowment for scholarships—at least a partial answer to concerns over the increasing debt of veterinary students in comparison to their likely practice incomes. Given the high tuition at Penn, and increased availability of openings in state schools (a situation common to many of our professional Schools), in the future, prospective students may hesitate to assume the large debt that many are asked to bear if they wish to be educated at Penn.

### Prospects

The University's concerns about its School of Veterinary Medicine focus on financial issues. The School's faculty is generally excellent; the educational program is sound and undergoes frequent review. The School's two hospitals are models of their kind. They operate at a deficit, but this is typical of university veterinary hospitals. As long as adequate funding is available, Penn intends to maintain a first-rate School of Veterinary Medicine at a size consistent with the School's durable income base.



# Professional Schools

## Communications

Penn's Annenberg School of Communications is unique in the nation for its pioneering excellence in communications research and policy. In the past five years, the School's activities have grown considerably. It has initiated an undergraduate program in the Faculty of Arts and Sciences, launched new publications, and organized national and international conferences. It has established, in cooperation with the Annenberg School at the University of Southern California, a program in communications policy studies in Washington, D.C. At the same time, major research projects have been conducted, and extensive archival resources and data bases have been assembled. This spring, the School moved into its renovated and greatly expanded facilities.

The Annenberg School has a dual identity. On the one hand, it is supported by a not-for-profit entity (known as "The Annenberg School") headquartered in Radnor, Pennsylvania. On the other hand, it is a graduate school established by the University's trustees as the Annenberg School of Communications. Established in 1959, the School is operated through a joint committee by the University and the Radnor-based corporation (which also supports the Annenberg School at the University of Southern California).

Extensive promotional efforts have been underway to broaden the national and international pool of qualified applicants for admission to the graduate program. The average number of application inquiries rose from 1,512 per year in 1979 to 1,992 per year in 1984. Applications have increased over this same period from 113 to 154. In addition to academic communications study, the School's faculty are drawn from such fields as sociology, psychology, education, economics, English, anthropology, and political science. Moreover, the School's associated faculty of 25, comprised of members from twenty different University departments, furthers interdisciplinary interaction across the Penn campus.

### Research Priorities

The Annenberg School of Communications' faculty, along with its 120 graduate students, conduct research within three broad areas of specialization.

- *Codes and Modes:* General theories and models of information and communication; coding and processing in different "languages," media, and modes; analysis of meaning, content, symbols, and message systems; and the social contexts of communication.
- *Behavior:* Individual and social interaction and experience through messages; encoding and decoding characteristics of sources and receivers; attitude formation and change; public opinion and collective behavior; the consequence of exposure to messages; mass communication and socialization.
- *Systems and Institutions:* History and theories of social and mass communications; public policy related to communications and popular culture; organization, technologies, regulation, management, and social functions of communication institutions and media.

Graduate students are introduced to these three core areas and make scholarly contributions to at least one, in the form of a thesis or dissertation.

Two recently completed research projects indicate promising directions for the next few years. The first, entitled "Religion on Television and in the Lives of Viewers," studied the effect of viewing on religious beliefs. This project sought to discover which messages and appeals cultivate particular types of responses, and the implications for church attendance, support, and policy. The second, "The Role of Television Entertainment in Public Education about Science," examined the ways that television helps shape public conceptions of science, technology, and scientists. Supported by the National Science Foundation, the National Institute for Mental Health, and other foundation grants, these

studies were a part of the School's larger "Cultural Indicators" project, designed to investigate the content of network television and viewer conceptions of social reality since 1969.

The School's faculty are engaged in other grant-supported projects as well. One study, conducted in Appalachian Kentucky, examines the potential of new communication technologies in helping to solve social problems and meet human needs in isolated rural areas. Another examines the role of communications in assisting national development efforts in Africa and Asia. A third investigates communications practices of native culture in Papua, New Guinea.

### Priorities in Undergraduate Education

The Annenberg School supports an undergraduate major in communications. As the School's five-year plan states, that program combines "the insights and methods of the social sciences with those of the humanities and the arts in fashioning a liberal arts-oriented perspective on communications as a central dimension of human experience." Intended as a modest-sized major, it has proved extremely popular, with applications running twice the number of available spaces (even after the relaxation of the original fifteen-student per-year limit).

The undergraduate major is overseen by a Committee on the Communications Major, which comprises approximately equal numbers of Annenberg and School of Arts and Sciences faculty. It is organized according to the three core areas of inquiry that frame the School's research programs and is designed so that undergraduates can specialize in any of the three.

The operation of the undergraduate teaching program, as well as research and graduate teaching, has improved substantially now that the School occupies its expanded facilities. The new space allows more comfortable provision of large undergraduate courses and accommodates the increasing use of audio-visual equipment. In addition, the layout and design of the new facilities (including the renovated portions of the original Annenberg building) facilitate undergraduate teaching without interference to research and graduate teaching activities.

### Concerns

In considering the Annenberg School's ability to expand the scope of its efforts, a primary concern is the potential over-extension of some of its faculty, who even now must often assume administrative responsibility in addition to carrying out research projects and teaching both undergraduate and graduate students. Given the School's intent to remain essentially at its current size, care will be required to ensure that resources are available to support academic undertakings.

A second concern centers on the distribution of undergraduate course credits between the School of Arts and Sciences and Annenberg. It is important that Annenberg's efforts in this area be recognized as significant contributions to undergraduate education.

Finally, though Annenberg's Washington program shows substantial promise, its geographical distance presents potential concern in terms of maintaining consistent program control and quality. In order to guarantee the high caliber of its efforts, this program requires careful monitoring.

### Prospects

The Annenberg School is characterized by energetic and innovative faculty. It plans in the coming years to expand curricular opportunities for undergraduates while enhancing its strength in the areas of communications systems and policies. With continued external—as well as internal—support, the School can continue to develop its special contributions to the field of communications.

# Education

In many ways an entirely new Graduate School of Education has emerged over the last ten years. Two-thirds of its 31 standing faculty have joined the School since 1975. Despite a decade-long decline in the number of young people interested in teaching as a career, and dramatic reductions in both federal support and school-system funds for educational research, Penn's Graduate School of Education has preserved and extended its enrollment base while recruiting both junior and senior faculty with broad, often externally supported research interests.

These successes are a tribute to the imaginative leadership of the Dean as well as the School's careful husbanding of its resources. The School, which faced possible dissolution in 1975, has operated during the last ten years with a balanced budget. The School has strengthened its Psychology in Education division, which traditionally has been both the largest and most selective of the School's programs, while bringing together its other programs into three broad divisions: Educational Leadership; Education, Culture, and Society; and Language in Education. The last two programs integrate the School's new emphasis on linking educational practice and experience with disciplinary research in linguistics and anthropology.

Speaking on behalf of his School, the Dean stresses that its purpose is "not to be an enclave of the profession of education within the University, but rather to be the focus of what the University does about education." Accordingly, the School's mission is "to make significant contributions at the forefront of advances in the field of education in the context of strengths and concerns of the University and the surrounding region." The School's research contributions take two forms:

- advances in basic knowledge of educational processes;
- improvements in professional practice.

Its educational mission involves primarily the preparation, at the graduate level, of

- scholars seeking academic and research positions in education;
- professional personnel seeking leadership positions, particularly educational specialists (other than teachers).

## Research Priorities

As a small professional school, Education's research priorities largely reflect the sum of the ongoing inquiries of faculty and graduate students. As part of its general investment in linguistic and ethnographic approaches to educational analysis, the School edits a journal in social linguistics, *Language in Society*, and now hosts annually a national Ethnography in Education Research Forum. In addition, the School has established a Literacy Research Center, which it hopes will grow into a major center of integrative research over the next five years.

The School is also making a major investment in microcomputers, and hopes to provide each member of the faculty with both dedicated use of a microcomputer and access to technical staff for support in teaching and research usages. Finally, the School is beginning renovations to increase the research capacity of its building. The first beneficiaries of these efforts will be the University's Higher Education Finance Research Institute and the School's Literacy Research Center.

## Priorities in Undergraduate Education

Currently the School contributes to undergraduate education in four ways:

- It provides a major in Elementary Education for students in the College who wish to be prepared professionally for elementary school teaching.
- It provides submatriculation for undergraduates in a variety of professional fields in education, particularly secondary education, computer education, psychological services, and teaching English as a second language.
- It offers disciplinary-based undergraduate courses in the history, anthropology, linguistics and psychology of education that provide undergraduates an opportunity to reflect critically upon their own education and development as individuals of a certain social, cultural and gender origin, and to better understand the complex, reciprocal relationships between education and American society.

- Its faculty teach a number of courses at the 500 level that introduce students to major fields in education. Some of these courses provide opportunities for qualified and interested juniors and seniors to begin submatriculation sequences and to examine in some depth issues that relate to their development as individuals or to their possible future careers.

Over the next ten years, many expect interest in teaching as a career to increase, particularly if teachers' salaries become more competitive and the nation as a whole carries out its commitment to educational excellence. In 1983-84 there were 31 students in Education's teacher preparation programs, a decline from 188 students in 1970-71. However, the maturing of the current teaching labor force, and the increasing incidence of teacher shortages, suggest special opportunities in the time ahead. As the number of Penn undergraduates interested in teaching grows, the School's contributions to undergraduate education will increase substantially in both scale and scope.

## Concerns

Two sets of concerns are occasioned by the School's planning for the future. First, many of Education's faculty, as well as its students, are part-time. The School has been successful in recruiting scholars of the first rank to its standing faculty. The same selectivity and demonstrated quality in the School's part-time faculty appointments, however, has been difficult to achieve. There is also a disparity among the School's graduate students, though part-time students are clearly essential both to the School's educational mission and to the University's outreach to Philadelphia and the Delaware Valley. When financial aid is available, Education recruits graduate students of a caliber equal to any in the University. Indeed, the School has won an extra allotment of scarce central funds for graduate fellowships because of the School's demonstrated ability to attract first-rate graduate students at the Ph.D. level. On the other hand, in some, but clearly not all, of the Master's, Ed.D., and off-campus programs the quality of applicants remains a concern. The issue is one of maintaining balance between full- and part-time orientations; in this context, a reduction in part-time faculty might enable the School to be more selective in admitting part-time students.

The second set of concerns is conceptual. Much of the School's success over the last decade has resulted from the application of scholarship in the social sciences—particularly psychology, and, recently, linguistics and anthropology—to the study of education. The result has been that while Education has much improved from the School of ten or twenty years ago, it retains a thrust quite uncommon to other schools of education. This emphasis gives it unique strength, but it also entails risks. Should the School consider directing more of its efforts to the areas associated with some of the leading schools of education in the country: educational efficiency, and equity as reflected in federal, state, and local financing? Finally, the School is one of the few in the University without a Board of Overseers. At some time in the future, such a Board might help advise the School in considering these and related questions as well as in fund-raising.

## Prospects

The School acknowledges the validity of these questions, but also points out that it is now taking important steps to institutionalize its programmatic perspectives. For example, it has instituted two mandatory field-of-education courses, one in the social history of educational institutions in the United States, and the other a broad introduction to alternative modes of research inquiry. At the same time, the School is now searching for a senior scholar to head its Educational Leadership Division. It is expected that this appointment will prove an important spur to current efforts that focus on the "quality of education" in the primary and secondary school classroom.

A larger challenge facing the School is to broaden the range of its current investments in disciplinary-oriented research and practice, and involve these even more closely in its teaching programs that focus on the development of effective schooling. A sustained effort in this area could give the School increased national visibility.



# Fine Arts

The Graduate School of Fine Arts offers a diverse range of programs, from highly personal tutorial instruction in painting and sculpture to innovative research and instruction in energy management and appropriate technology. Drawing the School together, a common conceptual thread unites faculty and students in their dedication to "the understanding of the nature of the built and natural environment and how the lives of peoples and societies are facilitated and supported by that environment." What results is a setting for learning that includes traditional elements of painting, sculpture, printmaking, architecture, landscape architecture, and city and regional planning bound together with the newer disciplines of historic preservation, appropriate technology, energy management and policy, government administration, and urban design. In a real sense, the diversity of activities within the School of Fine Arts reflects the broad diversity of the University itself.

Ties among the programs vary in strength and scope. Visualized as a chain, the Fine Arts programs link most directly to Architecture, which is closely joined to Landscape Architecture, Historic Preservation, and Urban Design, which relate directly to City and Regional Planning, which in turn link to Energy Management and Policy, Appropriate Technology, and Government Administration. If there is a conceptual difference between architecture, landscape architecture, and city and regional planning, it is that the first two, as design disciplines, emphasize synthetic skills, whereas the latter emphasizes analytic skills and process.

The School's newest programs—Government Administration, Historic Preservation, Appropriate Technology, and Energy Management and Policy—represent the innovative targeting of timely opportunities. All of these areas are currently attracting the interest of practicing professionals as well as students. Energy Management and Appropriate Technology work together with City and Regional Planning as an inter-related unit.

In its five-year plan, the School of Fine Arts states a primary goal:

The support and strengthening of those programs and activities that are a part of our heritage, and of the professions we serve, we view as viable ongoing needs and directions for the foreseeable future.

At the same time, the School plans to target new opportunities as well as strengthen ties between the programs within the School and the University by developing core curricula, collaborative planning and design workshops, and cross-disciplinary courses and programs.

## Research Priorities

Beginning in the 1960s, Environmental Planning and Design began placing special emphasis on understanding the complex nature of the environment. As a result, the School of Fine Arts introduced two new emphases into its curriculum. The first involves an increase in the School's scientific and technological resources, research activity, and instruction. The other involves developing an increased understanding of planning and design processes as well as methods of analysis and evaluation. Concurrently, a need has arisen for enhanced understanding of complex arrays of information, and of the means by which this information is applied. Consequently, the development of increasingly sophisticated methods of quantitative analysis, modeling, and evaluative techniques are continuing School objectives.

The School has increased its research activity in terms of the number of students and faculty participating in projects, the number of proposals submitted and grants received, and research dollar volume. The School has been focusing on increasing research and on supporting individual faculty with strong research interests. Some of this activity has come from the Center for Environmental Design and Planning, established in 1981. In one of its roles—providing support services for the School's research community—the Center has created a greater awareness of research opportunities and has facilitated the proposal submission process. The Center has also joined in forming research consortia on the Penn campus. In other research areas, faculty in the graduate group in Architecture are defining research agendas for each major architectural field, with the intent of further improving and increasing research activity in the Ph.D. program.

Despite serious reductions in federal support and a decline in national interest in disciplines central to the School's mission—such as urban revitalization, housing and environment, energy, urban mass transit, and historic preservation—the School has both maintained its research position and has modestly increased its level of income from sponsored research.

## Priorities in Undergraduate Education

Though a graduate school, the Graduate School of Fine Arts and its faculty are committed to participating in undergraduate programs. The School is responsible for three Arts and Sciences majors: Design of the Environment, Fine Arts, and Urban Studies. Courses in each of these areas are offered to non-majors as well. The School also offers a Bachelor of Fine Arts through the College of General Studies, in cooperation with the Pennsylvania Academy of Fine Arts. In addition, it strongly supports efforts to increase interaction across the University, and currently participates in two joint B.A. programs with other Schools: one linking Design of the Environment with the School of Engineering and Applied Science; the other a collaborative effort between Historic Preservation and the Department of American Civilization in the School of Arts and Sciences.

Of the University's graduate professional Schools, Fine Arts is the most active in undergraduate education. In 1983-84, its faculty were responsible for the teaching of 1,225 undergraduate credit units.

The School is taking steps to develop its undergraduate offerings. First, through changes in the curriculum and recruitment, it hopes to increase the number of majors in Urban Studies. In addition, it plans to increase non-major enrollments in the fine arts and submatriculation in the Design of the Environment and Urban Studies programs.

In the future, the School proposes to take additional steps, such as developing the Environmental Science major with Geology and increasing participation in undergraduate education by Landscape Architecture and Regional Planning faculty. The School also plans to take part in University-wide initiatives, including Freshman Seminars, and the Writing Across the University program.

## Concerns

There is a potential danger in a school that comprises widely diverse components. As the Dean has stressed, care must be taken to ensure the continuing interaction of Fine Arts' departments and to avoid fragmentation within the School. During the next five years, substantive interaction should be institutionalized; students should be encouraged to explore courses across School departments and the University as a whole, and faculty should be encouraged to engage in cross-disciplinary research.

Another concern is the diminishing interest on the part of federal agencies in supporting research on environmental issues. A related concern has been the downswing in perceptions of the value of planning as a profession in our society, and a subsequent diminishing of student interest in pursuing professional education in planning.

More generally, the School's financial viability relies heavily on tuition income and University subvention. Encouraging progress has been made in increasing endowment and identifying additional sources for funded research. Can the School realize its goal of sufficiently increasing the endowment and establishing a large enough research base to ensure a sound academic program for the future?

## Prospects

It is critical for the School of Fine Arts to maintain the quality of the faculty both through increased support of the present faculty and through appointments. The School intends to continue to support a balanced component of standing faculty dedicated to research, and associated faculty from the professional community engaged in practice. The percentage of associated faculty in the design and fine arts disciplines is usually higher than in the planning programs. In some instances greater interaction, economies, and productivity may be realized by developing functional relations between programs, for instance, between Urban Design and City and Regional Planning or between Regional Planning,

Energy Management and Policy, and Appropriate Technology.

The School plans to expand student financial aid both through fellowship and student loans. Four new types of graduate fellowships are planned, including one that would involve an internship in the donor's firm and another to be earmarked specifically for students in the Painting, Sculpture, and Printmaking programs. In addition, the School expects to participate with the University in making available long-term loans to students and their families.

At the same time, the School anticipates revenues from its new com-

puterized research and planning contract services, which are available to municipalities and professionals as well as the University. The School is in the midst of an overall process of defining and developing a greater number of opportunities in the private and institutional sectors, and is encouraging the innovation of new activities and programs that address critical issues in environmental design, planning and management, and in the Fine Arts. While fostering its special strengths, therefore, Fine Arts is prepared to embrace new ventures and recombine existing resources.

## Law

The Law School has earned an academic reputation that places it among this nation's leading schools of law. Its faculty include some of the best in the country and its student body is chosen from among outstanding graduates of the finest colleges and universities; indeed, the Law School is one of the most selective within the University. This past year, the School received 3,335 applications for the 225 places in the first-year class.

The School's plan states:

The quality of our Law School will depend in the future, as it has in the past, essentially on three elements: the strength and dedication of its faculty; the talent and character of its students; and the availability of an environment in which the analytical and human qualities that make for superb and influential lawyers can flourish. In the past, we have had these strengths. For the future we must be sure that they are maintained—indeed improved—so that we will build upon the achievements made and the reputation earned.

To preserve and build on its strengths, the School has established as its goals:

- building its faculty to 40 full-time tenure track teachers by 1990;
- rethinking its curriculum, including opportunities to broaden legal education by capitalizing on the intellectual resources of the University;
- revitalizing the Biddle Law Library, principally by providing increased support;
- maintaining need-blind admissions, which will require the raising of new financial aid funds, particularly for those graduates who pursue careers in government service, teaching, and public fund-raising work.

To achieve these goals, particularly the growth of the faculty to 40 tenure-track teachers, the School of Law has launched an ambitious development campaign.

### Research Priorities

Research at the Law School has been a primary concern of individual faculty members. Traditionally, their research activities have not been supported by outside funding, though the faculty has established a strong record of scholarly publication when compared to that of other schools of law.

The School is now taking some important steps to provide institutional as well as financial support for faculty research. The work of its expanding Institute for Law and Economics and its Center for the Study of Financial Institutions, whose efforts include the publication of the *Journal of Comparative Business and Capital Market Law*, has earned increasing attention as well as external funding. The investment in microcomputers represents a second means by which the School is increasing research support. Finally, the net proceeds from the School's Continuing Legal Education Program are being devoted exclusively to supporting faculty research and supplementing faculty salaries.

### Priorities in Undergraduate Education

In the past, the Law School's modest contribution to undergraduate education was based principally in the particular interests of individual faculty members in teaching undergraduates. Their ability to do so depended on matching these interests with the needs of an undergraduate School, on their ability to work out appropriate financial arrangements and to ensure that the Law School had adequate coverage for courses they would otherwise teach. The School of Law is now committed to playing a more direct role in undergraduate education in the future, and looks forward to working out a series of arrangements with the undergraduate Schools.

### Concerns

Two sets of concerns must be addressed as the Law School plans its future. The first derives from the financial pressures the School will face in reaching its primary goals of increasing faculty size and compensation, preserving its need-blind admissions policy, and increasing financial support for the Biddle Law Library. Currently, the School expects to meet these demands by dramatically increasing annual giving and by raising substantial individual gifts. If the School's campaign falters, then its planning goals will have to be reconsidered.

The second set of concerns revolves around the School's role in the University. Nationally, schools of law often practice a kind of separatism that leads them to operate their own facilities, manage and keep separate their libraries, and operate on academic schedules often at variance from those of their universities. At Penn, the Law School has an important opportunity to broaden its involvement. The School's plan specifically encourages the "exploitation of resources available to the Law School from being located in a great University." The work of the Institute of Law and Economics is an important example of bridges that can be built. As the School expands its faculty, it is desirable that a significant number of new appointments be made jointly with other Schools of the University.

### Prospects

The Law School's current reputation is built on strengths developed in the 1960s and early 1970s. During this period its faculty and student body won recognition both nationally and abroad. Today, the Law School is poised for a comparable burst of energy and creativity.

In terms of curriculum, the School's clinical legal education program has expanded significantly. Currently, more than half the members of the graduating class have taken at least one clinical course. The newly-authorized practice professorships should aid in strengthening the clinical program even further. The imaginative curricular review now underway promises other important developments for the future. These may include placement of increased curricular emphasis on legal theory, lawyering skills, the legal profession, and the lawyer as problem-solver and a force for conflict adjustment. Potential broad-based developments may involve enhancing the structured progression of the School's curriculum, heightening the diversity of teaching methods and materials, expanding interaction with the practicing bar, and furthering interaction with other University disciplines. The School attracts a substantial and strong cadre of foreign students, and is building a lively program designed to ensure that the Law School community devotes adequate attention to international concerns. In another context, Law School faculty meet regularly in research seminars to expose their work-in-progress to critical peer review. Plans are being made to further encourage faculty interaction.

The School has taken important steps to address the needs of the Biddle Law Library, the first being the appointment of a strong new Director. She and her colleagues are working to restore the Library to the level of quality essential to faculty and student research and teaching. Recognition by the School of Biddle's significance as a University resource should lead to increased central investment in the Library toward its campaign for excellence.

These and other steps augur well for the School. It faces a number of real challenges. At the same time, the present generation of faculty and students, with support from alumni and friends, has a prime opportunity to strengthen the School academically and expand its intellectual horizons.



# Social Work

Social Work schools throughout the country are facing difficult pressures as a result of the virtual elimination of federal training grants. At Penn, graduate stipends from federal sources were cut from \$122,000 in 1979 to virtually zero today. Largely as a result of this, the number of Master's degree students in the School of Social Work has sharply declined: from 230 to 140 in 1984. A consequence has been a reduction through attrition in the School's faculty from 24 full-time members in 1979 to fifteen in 1984.

Another result of these shifts has been the forced allocation of a disproportionately large share of faculty time to teaching as opposed to research. The School of Social Work has developed an ambitious five-year plan to enhance its research capacity while maintaining its traditional strength in preparation for leadership roles in professional social work and social welfare. The plan's broad strategy will also serve as a framework for the current transition to a new Dean.

In addition to further strengthening and enriching its existing programs in professional education at both the Master's and doctoral levels, the School has four key objectives, as stated in its five-year plan:

- to continue to build research programs and capabilities, especially interdisciplinary research programs with other units of the University and with the professional social work community;
- to work with the College of Arts and Sciences in expanding elective courses for undergraduates;
- to promote submatriculation to attract more undergraduates to pursue both the B.A. and M.S.W. degrees;
- to fulfill the University's responsibility to the professional community of social work by offering a range of continuing education courses, geared to expanding knowledge and the changing needs of the community.

## Research Priorities

The School's five-year plan recognizes a need to increase faculty research productivity and to expand external funding to support that research. The School's goal is to meet 20 percent of its budget with external funding by 1989. It currently receives 3.4 percent from that source. Even in times of strong federal support, such an increase would present substantial challenges.

The School has three interrelated efforts underway to enhance the research capabilities of its faculty: a monthly faculty research workshop, a special course on computer skills, and a seminar on research methodology. The School's Research Center is the focal point for assisting faculty and students in their research efforts, particularly through computer support. The research component in both the Master's and Doctoral degree curricula has been strengthened, especially in regard to curricular diversity and computer use. Perhaps most important, the faculty are now working collectively, sharing research ideas, and providing advice to each other on research projects.

The expanded research effort will focus on practice implications for social policy decisions as well as on testing practice models through both quantitative analyses and case studies. Research will concentrate on seven substantive areas: aging, child welfare, education, health care, justice, racism, and issues related to work. The School already has a number of links with foreign institutions that should help strengthen the international aspects of the research work while it maintains a predominantly domestic focus.

The School will achieve its research goals only if it is able to further its interdisciplinary programs within the University as well. Currently, its ties are strongest with the Schools of Nursing and Veterinary Medicine, the Departments of History and Sociology within Arts and Sciences, and the Center for the Study of Aging. The School plan calls for strengthening existing ties with the Dental and Wharton Schools and developing other academic links within the University. At the same time, the plan calls for enhancing School collaboration with a group of public and private agencies in the Delaware Valley chosen from some 150 with which it is now associated. Those agencies serve as laboratories for action-oriented research.

The School's objectives in research are closely related to its doctoral

program. That program builds on the Master of Social Work degree and is the oldest and one of the strongest in the country.

## Priorities in Undergraduate Education

The School of Social Work has steadily expanded its undergraduate enrollments since 1980; undergraduate education will play an increasingly important role in the next five years. Current initiatives basic to the School's plan are: a submatriculation program in which students gain both a B.A. and a Master's degree in Social Work; undergraduate independent study and internship programs in social work; and graduate internships in such areas as student life, residential living, and health services—designed to serve the Penn undergraduate population.

The School has also started two new undergraduate courses, in addition to its ongoing Freshman Seminars, and is considering others. These courses will be publicized more actively than in the past. The undergraduate courses are specifically designed to expose interested students to the realm of social work as an integral part of a general education. At the same time, a liberal education is viewed by the School's faculty as the essential foundation for a professional career in social work.

## Concerns

Four areas of concern face the School in implementing its five-year plan. Most troublesome is the question of its ability to achieve the projected expansion in student enrollments, particularly at the Master's level. The plan calls for increasing the number of Master's students from the present 140 to 180. Unfortunately, internal resources are not available for expanding financial aid, and the external funding picture is discouraging. The School has been diversifying its sources of income and developing new specialties in such areas as aging and child welfare. It is considering more intensive recruiting, but attracting outstanding students capable of affording its tuition remains difficult.

The second area of concern regards the likelihood of the ambitious growth in research support envisaged in the School's plan. Federal cuts in research support generally intensify this concern. However, the School is better equipped than before to gain additional research funding, and it plans aggressive efforts to do so.

A third question is whether the School can raise the \$1.25 million it seeks in its current development effort. However, a number of steps are underway to enhance the Social Work development drive, and the current Seventy-fifth Year celebration is hoped to support those steps.

Finally, the School continues to face some space constraints in terms of classrooms, library, and offices. Can these constraints be overcome if the expanded efforts in research and teaching achieve their goals? Social Work is among the most heavily supported Schools—on a percentage basis—within the University, and that is wholly appropriate given the mission of the School and its importance to Penn. It is unlikely, however, that University support will be significantly expanded in future years.

## Prospects

The traditional strength of the School of Social Work is in the realm of practice. It has a long and excellent record of collaboration with many social service agencies within the community in educating graduate students. Those collaborations are key links for the entire University to the Delaware Valley.

The School has a continuing commitment to those in need of social services, particularly minority group members. That commitment is reflected in its recruitment of minority faculty and students, in its curriculum, and in the leadership roles of its minority faculty and students within the University and the wider community.

The School of Social Work's plan, and the dedication of its faculty, students, and alumni, are symbols of the School's potential to maintain its current strengths and achieve its research and undergraduate program objectives as well.

### III: Balanced Diversity

One of our key assumptions is that Penn can best exploit its comparative advantages by maintaining its sense of balanced diversity. It is, therefore, important that we strengthen and maintain each of our Schools, and we reaffirm our intention to do so. However, while there can and should be shifts in the sizes of individual Schools as they expand to respond to new opportunities, or contract in order to provide adequate support for continuing programs, the overall profile of the University should not be dominated by any single School or group of Schools.

In this paper we have found it helpful to use a three-part classification of Schools to describe Penn's profile. According to this classification, the School of Arts and Sciences, the School of Engineering, the School of Nursing, and the Wharton School form one group. Each of these has both strong undergraduate and graduate Ph.D. programs. Three of the four are organized along departmental lines that reflect basic disciplinary boundaries.

The second group comprises the three Schools of Medical Science—the Schools of Dental Medicine, Medicine, and Veterinary Medicine. Each offers programs in the basic and clinical sciences. Each expects—far more than do other parts of the University—its faculty to raise substantial portions of their salaries from external sources. Each is responsible for patient care—for example, School of Medicine faculty play an integral role in the operation of the Hospital of the University of Pennsylvania (HUP), while the School of Veterinary Medicine operates two hospitals of its own. Each of these Schools of Medical Science also receives direct support from the Commonwealth of Pennsylvania.

The final group—the Annenberg School of Communications, the Graduate School of Education, and the Schools of Fine Arts, Law, and Social Work—comprises professional Schools whose presence ensures that Penn, almost uniquely among major research universities, offers the full scope of professional and graduate education. In scale they range from Annenberg, with 11 standing faculty and 116 students, to Fine Arts, with 32 standing faculty and 713 students. Each maintains its own facilities and separate administrative staff.

No classification of Schools is wholly satisfactory. The School of Nursing might have been grouped with the three Schools of Medical Science, as it is in the context of its relationship to the Vice President of Health Affairs. Nursing might, on the other hand, have been grouped with the five professional Schools, which are roughly the same size and are organized and managed in much the same way. The Graduate School of Education and the Annenberg School of Communications might have been grouped with the Arts and Sciences, Engineering, Nursing, and Wharton, since they too teach substantial numbers of undergraduates and offer the Ph.D. degree. The groupings employed here, however, offer a useful framework for understanding the relative scale of the University's principal units without focusing unduly on any one School or its prospects.

For each group of Schools we can provide three general measures of scale:

- standing faculty (including clinician educators);
- direct revenues (including indirect cost recoveries, Commonwealth appropriations, and restricted accounts);
- capital expenditures (including new buildings and renovations).

To provide a context for understanding our projections for the next five years, we have provided for each measure five years of historical data. Necessarily, projections of capital expenditures—which depend largely on external funding—are the most tentative.

Collectively, the four undergraduate/graduate Schools will remain

the largest earners of University revenues over the next five years. Their share of School-generated revenues has increased from 47.4 percent in 1979 to 49.7 percent in 1984, and current projections anticipate a further increase to 51.6 percent by 1989. Within the group, the proportion of unrestricted income has also increased, from 61.4 percent in 1979 to 64.0 percent in 1984. We expect that proportion to hold constant over the next five years. The size of the faculty has remained relatively constant over the last five years, and will increase slightly by 1989. If fund-raising efforts are successful, spending for capital projects may double over the next five years and include, among other projects, the new Mudd Plant Sciences building, the Wharton School's center for executive education (which will also house the University's placement offices), the School of Engineering and Applied Science's Computer and Cognitive Sciences wing, and a new entrance to the School of Nursing.

The Schools of Medicine, Veterinary Medicine, and Dental Medicine will similarly preserve their collective scale over the next five years, with growth in Medicine being more than offset by planned reductions in the School of Dental Medicine. Today, these Schools account for 43.1 percent of all School-generated revenues—a share that is expected to decline slightly to 40.6 percent by 1989. (These revenues do not include those of the Hospital of the University of Pennsylvania or the Clinical Practices of the University of Pennsylvania.) Changes in the size of the faculty have been principally the result of the decline in the scale of the School of Dental Medicine and the increase in School of Medicine's clinician-educators. Growth in the size of the faculty over these next years will be occasioned primarily by the School of Medicine's new investment in clinical research, which will also require the single largest capital expenditure over the next five years.

The importance of the five professional schools lies not in their scale, but rather in the diversity they provide the University. Collectively, these five Schools—Communications, Fine Arts, Education, Law, and Social Work—account for just under 8 percent of School-generated revenues. Over the next five years, that share should increase to 8.6 percent, though the five professional Schools will continue to be the most dependent on unrestricted income in general and tuition income in particular. These Schools also plan to continue their current rate of capital expenditures over the next five years.

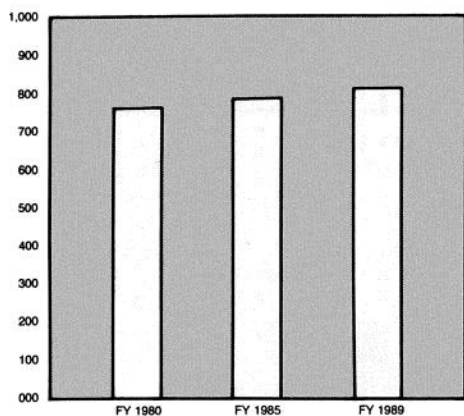
"Choosing Penn's Future" concluded that for an individual School to retain its current scale or grow it would be expected to satisfy three necessary conditions. It had to be able to

- preserve the strength and diversity of its student body;
- retain sufficient discretionary income to continue to invest in new initiatives, including the refurbishing of space and acquisition of critically important equipment;
- ensure the growth of faculty real income at both junior and senior ranks.

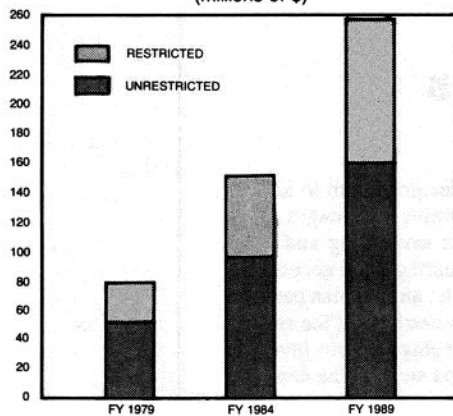
In applying those conditions, current analysis indicates the following areas of possible growth: first, if National Institute of Health funding for clinical research continues to increase, the standing faculty in the School of Medicine will grow modestly. This growth will also be funded in part by the School's hosting a new Howard Hughes Institute. To ensure that the Wharton School's new investment in executive education does not detract from the School's strong undergraduate, M.B.A., and research programs, a slight increase in Wharton faculty will be required. Finally, the School of Nursing will be encouraged to increase its undergraduate student body to 340 full-time students, while the Law School faculty will increase to 40 if sufficient external resources can be identified.



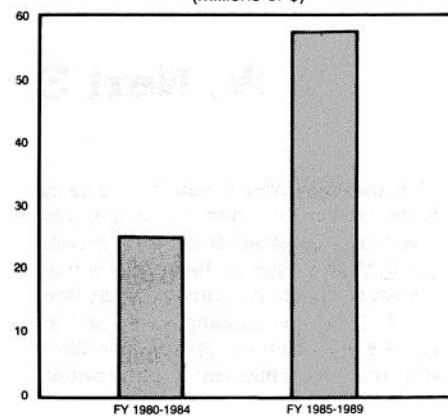
**Undergraduate/Graduate: Standing Faculty**



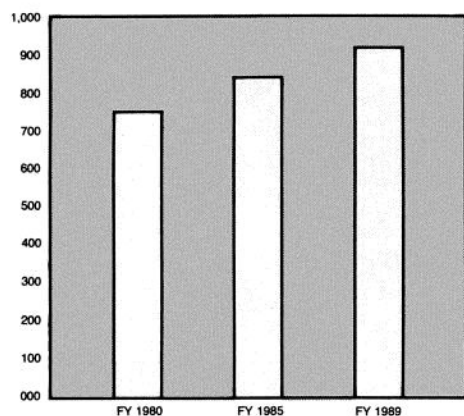
**Undergraduate/Graduate: Revenues**  
(millions of \$)



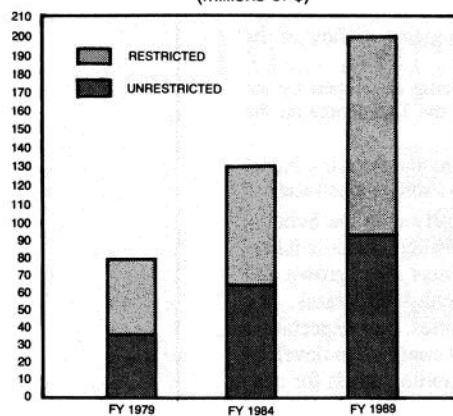
**Undergraduate/Graduate: Capital Expenditure**  
(millions of \$)



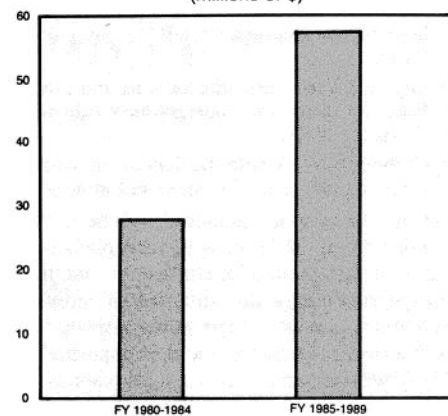
**Medical Science: Standing Faculty**



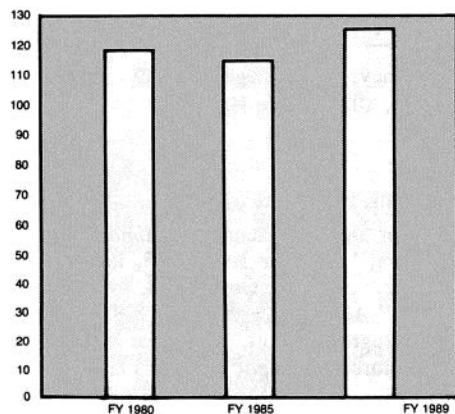
**Medical Science: Revenues**  
(millions of \$)



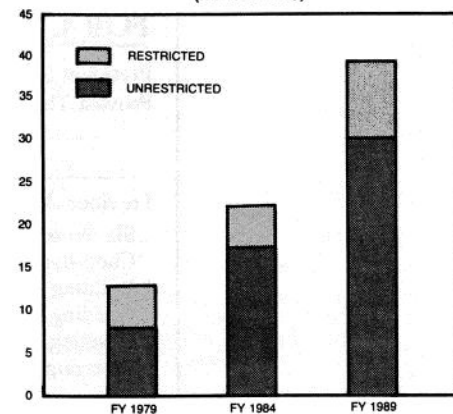
**Medical Science: Capital Expenditure**  
(millions of \$)



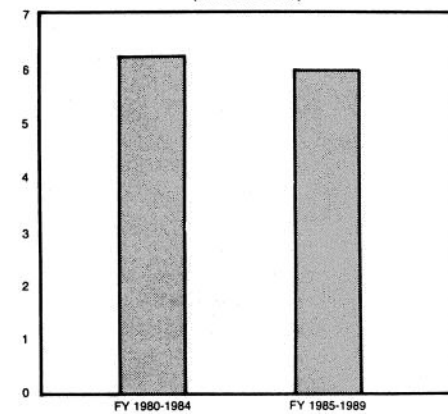
**Professional: Standing Faculty**



**Professional: Revenues**  
(millions of \$)



**Professional: Capital Expenditure**  
(millions of \$)



## IV: Next Steps

The planning cycle begun four years ago was designed both to identify the University's current strengths and comparative advantages and to develop a program of strategic investments for preserving and extending Penn's capacity for scholarly inquiry. Planning must necessarily proceed at both the University and School levels, and no plan can or should be static; continuing review and revision is needed. At the same time, we must increasingly turn our attention to seeing that our investments bring their intended improvements. The next steps at the central level are to

- ensure support for existing faculty in terms of both growth in real income and needed assistance for research and teaching;
- develop operating procedures for the expanded Undergraduate Education Fund and for the Infrastructure Bank, which will fund central investments in the University's research capacity;
- continue to expand the Penn Plan, including identifying long-term sources of capital;
- further increase unrestricted support for graduate fellowships in conjunction with a thorough review of our graduate programs leading to the Ph.D.;
- implement the curricular options and programs being developed by the Faculty Council on Undergraduate Education and the Task Force on the Freshman Year;
- continue to work with the Schools in making certain that Penn is a leader in the recruitment of women and minority faculty, students and staff.

Our most important challenge will be to work closely with the Schools to ensure that the promise of their plans can be fulfilled. Penn is inherently an entrepreneurial University, one that has most often grown and prospered through the initiative of individual faculty, programs, and Schools in pursuit of their own academic opportunities. Our expectation is that over the next decade new opportunities will continue to develop. Many will be service-oriented, in response to expanding needs for continuing education as well as for clinical practice and research, broadly defined. Most, if not all, such activities will be School-initiated.

Emerging from these first systematic attempts at School planning is the prospect of building better connections among Schools as well as between those individually initiated activities and the hub of the University—in particular, undergraduate education, the Library, and the University's emerging computer network. We envision a series of strategic investments that will fulfill Penn's commitment to academic excellence while maintaining its balanced diversity.

### FOR COMMENT

President Sheldon Hackney, 100 College Hall/CO  
Provost Thomas Ehrlich, 102 College Hall/CO

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Previous documents in this University series:

- "Six Working Papers for Strategic Planning," *Almanac* January 15, 1982
- "Choosing Penn's Future," *Almanac* January 25, 1983
- "Building Penn's Future," *Almanac* October 18, 1983
- "Building Connections," *Almanac* October 25, 1983
- "Planning at Penn: A Progress Report," *Almanac* May 1, 1984
- "Investing in Penn's Future," *Almanac* January 17, 1985