Penn's Faculty—
Keeping Alive the Spirit of Discovery

Excerpts from the 1986 Annual Report

To the University Community:

There are many criteria by which to measure excellence at a university: the achievements of its students and alumni, the coherence and rigor of its academic programs, the breadth of its facilities, the size of its budget, and numerous others. But what is the essential element of a great university, without which it could not survive?

The quality of a university begins with its faculty, who are the standard by which it is ultimately judged. That is why any efforts to strengthen and ensure the continued quality of a university must ultimately focus on its faculty. The faculty, as the saying goes, *are* the university.

At Penn today, this truism carries more weight than ever. In the next decade, there will be relatively few retirements from our faculty. In the years after 1995, however, the pace of retirements will accelerate to the point where replenishing our faculty with appointments of the same high calibre will be much more difficult.

We need to do everything we can today to ensure the continued excellence of Penn's faculty into the next century. That means working now to attract and to retain the very best scholars, scientists, and teachers, and to provide them with the facilities and support services they need to remain at the forefront of the search for new knowledge in their fields.

Penn has maintained its status as a great university over a long period of time because it has been continually energized over the years with a steady infusion of extraordinarily talented people. The glowing intellectual health that we currently enjoy is testimony to this proud tradition, a tradition that must be perpetuated for our future.

Sheldon Hackney

—Sheldon Hackney

Cover: *James Wilson,* one of the six original Supreme Court justices and a signer of both the Declaration of Independence and the Constitution, organized Penn's law department and delivered the first law lectures in the Federalist period. *Alexander Dallas Bache,* professor of natural philosophy and chemistry, was a founder and first president of the National Academy of Sciences and also served as superintendent of the United States Coast Survey from 1843 to 1867.

A Special Place for Creative People

"Let such teach others who themselves excel . . . ."

—*Alexander Pope*

Penn is a special place. There is a spirit that thrives in our intellectual community, a spirit of inquiry and invention. Penn people are motivated to excel—in their disciplines and in their lives.

At the center of this community is a select group of scholars—the faculty of Penn. Through their teaching, opinions, discoveries, and accomplishments, these men and women set the tone of excellence for our University.

University faculty are the modern stewards of learning and culture, much as the great scholars of Renaissance Europe were in their own time. The spirit of discovery that inspired Copernicus, Michelangelo, and da Vinci lives today in the scholars and scientists who work and teach at institutions such as Penn.

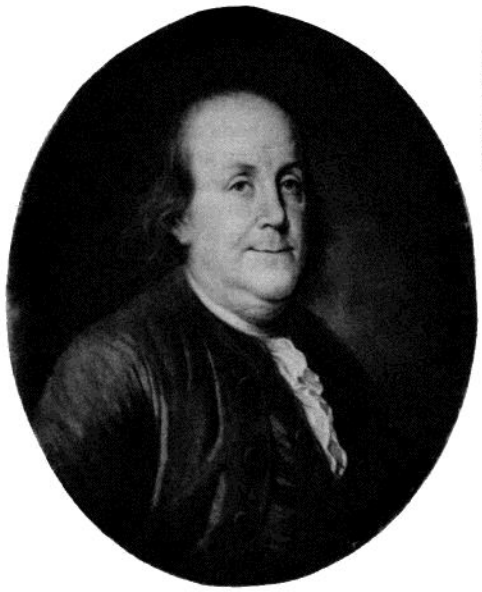
Today, we still reap the benefits of Renaissance inventions . . . movable type, the mechanical clock, the adding machine, the telescope . . . that produced an explosion of knowledge and broadened the world. And in the contemporary university, new breakthroughs carry on this tradition of development and discovery. ENIAC, the first large-scale, all-purpose, electronic digital computer developed at the Moore School of Engineering, created an industry and changed the world. "Quasi-crystals," a new form of matter recently proposed by two Penn physicists, offer the promise of new materials with a wealth of remarkable structural and electronic properties.

Throughout Penn's history, our faculty have been the pioneers whose advancement of knowledge in many fields—science, arts and letters, and the professions has made our University a place where creativity can flourish.

Faculty—A National Resource

The faculties of our major universities are a national resource. As with many of our vital resources, however, the supply of outstanding faculty is not without limit. This fund of capability must continually be built anew. Thus, as 1986 draws to a close, we at Penn—along with the other leading universities of this country—find ourselves at a critical juncture. After 1995, we will see the retirement of many of the distinguished scholars and scientists who joined university faculties during the 1950s and 1960s.

Since I outlined a strategy for strengthening the quality of our undergraduate education three years ago, we have demonstrated that we have the will and the ability as a university to make focused investments for the future. The time has come for us to focus on the most important investment of all—our faculty.



At Penn, the spirit of inquiry and innovation of its founder, Benjamin Franklin, still flourishes after nearly two-and-a-half centuries.

As we begin to seek the talented scholars and scientists who will carry the Penn tradition of excellence into the next century, it is worth examining just what makes our faculty so special. What is it that has moved them to answer the calling of university faculty? Why do Penn faculty choose to come *here*, and why do they stay? What sort of people do we need to preserve the character of this select group?

Some of the answers can be found in the following pages, in which some of the many exceptional individuals who comprise our faculty are profiled. I hope that, by reading about their experiences and sharing their opinions and perspectives, we will increase our appreciation of just how special a place Penn is.

A Tradition of Innovation

"This is the university that added to its traditional curriculum such subjects as applied mathematics, foreign languages, political science, and economics—all very new at the time. This is the university that introduced multidisciplinary education well before the term was even invented. This is the university that established the country's first school of medicine, then realized that theory could not be separated from practice and consequently developed the system of the teaching hospital now in general use. For all of these reasons, the University of Pennsylvania has been a true pioneer, and as we look back today, it is virtually impossible for us to estimate the contributions this institution has made to free intellectual development."

—*M. Valery Giscard d'Estaing*

These remarks, made ten years ago by the President of France as he received an honorary doctorate from Penn, say a lot about the character of our University. Essentially, they comment on our faculty—the individuals most responsible for making Penn what it is. For almost two-and-a-half centuries, Penn's faculty have set a standard for scholarship in an atmosphere of intellectual curiosity and creativity.

Penn became the nation's first university in 1765, when John Morgan founded America's first school for the theory and practice of medicine and launched a tradition of pioneering in the arts of healing. It was one of Hippocrates' precepts that, "Healing is a matter of time, but it is also sometimes a matter of opportunity." From Benjamin Rush's pioneering 1813 treatise on mental illness, *Medical Inquiries and Observations Upon the Diseases of the Mind*, to the fundamental discoveries in kidney function by Alfred Newton Richards in the 1920s, to the development in 1977 of the contemporary vaccine for pneumococcal pneumonia by Robert Austrian—outstanding physicians in our School of Medicine have never stopped seeking opportunities for healing.

These are specially talented and motivated people who approach their calling from a variety of perspectives. "The creative process attracted me to plastic surgery," says Dr. Linton Whitaker, a specialist in plastic and reconstructive surgery at the Hospital of the University of Pennsylvania, "I've always been interested in art and aesthetics and wanted to be a surgeon for as long as I can remember."

Many of our medical faculty are stimulated by the opportunity to pass on their knowledge and expertise to a new generation of physicians. "Teaching (is) what makes my life different from that of many physicians," notes Dr. Leonard Perloff, prominent vascu-

lar and transplant surgery specialist. "I have the luxury of associating with students and residents. I can extend myself beyond my fingers by teaching."

Since the first course in medicine for dental students was offered here in 1932, the faculty of our School of Dental Medicine have contributed their own legacy of innovation and discovery. Just this year, a new research technique called "protein engineering" was developed to study the molecular structure of the herpes organism. Results of these studies could hold the clue to developing an effective vaccine against herpes virus.

The Wharton School, founded in 1881 as the first collegiate school of business, has been at the forefront of economic and social thought. The ground-breaking theories of Simon Nelson Patten in the late nineteenth century, which conflicted with classical doctrine and heralded Keynesian economics, brought the United States into the mainstream of the developing social sciences—with Penn as a focal point.

In 1980, Lawrence Klein, Benjamin Franklin Professor in both the Wharton School and the School of Arts and Sciences, won the Nobel Prize for his work in econometric forecasting. This mathematical approach to economic modeling allows models to be built of entire economies, and simulations performed on them.

"More young Americans than ever are choosing to make business training a substantial part of their college educations," notes Marion Oliver, associate dean at the Wharton School. "As the most selective program in the country, Wharton is presented with both a heavy responsibility and, at the same time, a burgeoning opportunity."

Cultivating the Intellectual Individualist

In reviewing President Giscard d'Estaing's comments on Penn's pioneering tradition, I found his final phrase, "free intellectual development," to be particularly appropriate. Just as a university is only as great as its faculty, its faculty can achieve their true potential only if the university provides the resources they need in an environment of intellectual freedom.

History is replete with examples of brilliant individuals whose discoveries and perceptions were suppressed by the intellectual or political climate in which they lived and worked. Galileo, for example, was condemned by the Inquisition for demonstrating the Copernican theory of a sun-centered solar system. Even today, in modern democracies, the individual initiative of intellectual pioneers can be discouraged by the "bottom line" strictures of a profit-oriented economy. To institutions such as ours falls the responsibility of providing a nurturing environment for the intellectual individualist whose theories or methods may be unorthodox. Penn has a long and proud tradition of celebrating the individual, of providing a supportive environment for promising, albeit unconventional, ideas.

Penn's faculty are accustomed to using their own entrepreneurial energies to find ways of accomplishing what they want to do, and exploring what they want to explore. The history of our faculty is full of intellectual individualists who, allowed to pursue their work as they saw fit, produced an extraordinary body of new knowledge: the first American book on botany in 1768 by Benjamin Smith Barton; the establishment of the first psychological laboratory in the U.S. by James McKean Cattell in 1887; the landmark treatise on racial segregation (*Reflections on Segregation, Desegregation, Power, and Morals*) by Penn's first tenured black professor, William T. Fontaine, in 1967. Time and again, Penn's philosophy of encouraging creative faculty to "do their own thing" has paid handsome dividends for the University—and society.

The opportunity to do *his* own thing brought robotics pioneer Richard Paul to our School of Engineering and Applied Science last year as a professor of computer and information science. Working in private industry was depressing, he says, because of the constrictions it placed on his work. At Penn, Paul has found "the right environment" for what he wants to do. He calls it "Ivy League Robotics"—the development of "smart" robots. Referring to the more than 8,500 industrial robots currently in use as "little more than one-armed mechanical manipulators," Paul defines smart robots as intelligent machines that can sense, adjust to, and manipulate their environment.

Because of the University's programs in cognitive science and artificial intelligence, he says, Penn's robotics laboratory is uniquely capable of concentrating on the development of smart robots. A native of Australia, Professor Paul has definite opinions about his work and its consequences. "Just throwing people out of a job without any concern is obviously a very bad thing to do," he says, "but if a society considers where automation is going to be needed, (automation) can be very useful—not just in where it's going to make the most economic profit, which is a blind, stupid way of doing anything."

Penn not only encourages its faculty to follow their own intellectual curiosity, it also provides an atmosphere in which professional development can take place as a scholar's or scientist's interests coalesce. "Professional development . . . requires exploration," says Frank Furstenberg, professor of sociology and a nationally known expert on divorce, teenage pregnancy, and other matters relating to the family. "It is necessary to tolerate a certain amount of aimless wandering and false starts in the course of intellectual adventures."

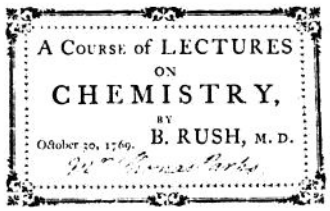
Sustaining the Humanist Tradition

"Life must be lived forwards, but it can only be understood backwards."

—Soren Kierkegaard

Faculty who teach the humanities at institutions such as Penn assume a very special role in society. They are the stewards of ideas, the wardens of our history of human thought and relations. "Humanists . . . seem to me obliged by their profession to see the human past as the rich and mysterious matrix of human knowledge and activity," writes David J. DeLaura, professor

John Morgan established the first medical school in America at Penn in 1765.



Benjamin Rush joined the University medical faculty in 1769 and published America's first textbook on chemistry a year later.

of English. "Humanistic study . . . is inevitably committed to the notion that the past is worth knowing for its own sake." Since our first provost, William Smith, laid the foundations of the modern liberal arts curriculum more than two hundred years ago, study of the humanities has been the cornerstone of a Penn education.

In the pragmatic atmosphere of the 1980s, students often speak of their desire for an education that will teach them a specific set of skills they feel they need for a high-paying job. When they enter the working world, however, they will eventually move out of a particular job or narrow specialty. Then, they will need broader skills, such as flexibility, judgement, and the ability to manage time, effort, and emotional input, to succeed on higher levels.

"This University," said Provost Thomas Ehrlich in an address to the class of 1990, "offers an extraordinary range of opportunities to develop the habits of inquiry that are the hallmark of the educated woman or man." By providing students with a wide-ranging humanistic view of the ideas inherited from the past, our liberal arts faculty help them attain the perspective and resourcefulness needed to adapt to new realities in an ever-changing world.

"Literature," writes Professor DeLaura, "and indeed the liberal arts as a whole are the very basis of self-understanding in our culture . . . ." One of the goals of anthropology, according to professor Alan Mann, "is to further our understanding of who we are and how we got this way." Bruce Kuklick, professor of history, refers to his discipline as "a form of self-knowledge: it tells us about ourselves, who we are, who we are not. For example, if we study revolution in ancient Rome, we may be interested not only in the peculiar qualities of Roman slave life, but also in the nature of institutions like slavery and feelings of rebelliousness that . . . are part of the human condition."

The responsibility of stretching young minds to develop the habits of inquiry of which Provost Ehrlich spoke is a great challenge that can also be its own reward. Jeffrey Tigay, associate professor of Hebrew and Semitic languages and literatures, expresses it thus: "Among the greatest lifelong gifts a teacher can give is a sense of how to draw inferences from evidence, how to go from facts to judgements and decisions—in short, how to think critically. The recognition of what the subject matter and the methodology together could contribute to students freed me to follow my heart into a career of research and teaching."

Stimulating Interdisciplinary Study

In a society increasingly prone to career specialization, the University provides a haven for those interested in working toward new perspectives and understanding via a broad-based approach that combines a number of disciplines. Penn has always provided an atmosphere of cross-disciplinary conversation in which faculty can utilize the vast resources of a major university to make new discoveries in established disciplines—or even start new fields of study. The growing number of formal interdisciplinary programs at Penn reflects the joining together of faculty to pursue shared interests from a variety of perspectives.

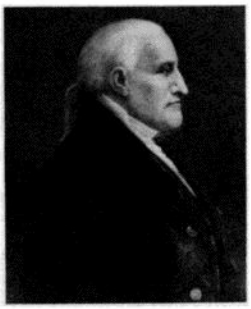
Nancy Farriss, professor of history and 1986 MacArthur Fellow, conducted research in several disciplines (including archival, archeological, and ethnographic studies) for her award-winning book, *Maya Society Under Colonial Rule: The Collective Enterprise of Survival.* Farriss cites Penn's Ethnohistory program, an interdisciplinary program for graduate and undergraduate students that draws on faculty from History, Anthropology, and other departments, as "the most profound influence on my work."

Larry Gross came to Penn in 1968 when he heard that the Annenberg School of Communications was looking for a "social psychologist with unorthodox interest." Gross, now a professor of communications, discovered that the Annenberg School provided the climate he needed to "move away from the confines of orthodoxy in social psychology and develop a broader interdisciplinary approach to the study of the arts and symbolic behavior in general." Professor Gross helped develop, and is now chair of, Penn's undergraduate inter-school major in Communications, which began in 1975.

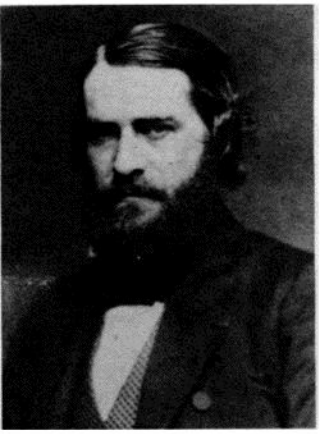
"Communications has been described as a crossroad where many disciplines meet," he says. "The faculty and program of the Annenberg School reflect and support a wide variety of approaches, research methods, and theoretical traditions . . . . We are united in the belief that a better understanding of the nature and processes of communication is one of the keys to the full employment of human potential."

Norman Adler, professor of psychology, is founder and chair of the Biological Basis of Behavior Program, an important new area of interdisciplinary study begun at Penn. Adler recalls that he was "turned on by the idea of applying the concepts of biology to behavior" when he first studied biology in high school. He was drawn to our faculty by "the presence of others who shared my enthusiasm for a broad-based study of behavior and the existence of an administrative and academic structure which would allow such a program to be developed." Adler discovered that the University already had the resources in place for the new field of study. "Penn is an unusual community," he notes, "because the relevant components (college, medical school, veterinary school, and engineering) are located on the same physical campus. Also, there is a tradition here of interdisciplinary courses of study."

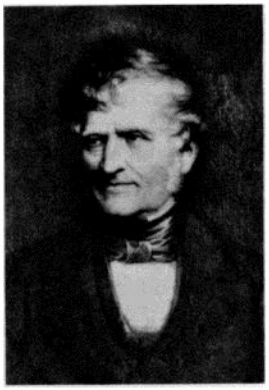
Interdisciplinary study is at the core of what makes Penn's School of Nursing one of the best in the country. Since nursing training began here one hundred years ago, nursing has evolved into a profession with a broad scope and vast and varied responsibilities. "Now more than ever," notes associate professor Diane O. McGivern, "the nurse must have a humanizing and edifying education. The opportunity to combine liberal arts and sciences with the direct care of people of all ages in settings as diverse as neonatal intensive care units and corporate employee health services makes . . . the School of Nursing exciting."



The first department of botany in this country was established at Penn in 1768, with Adam Kuhn as its first professor.



Joseph Leidy, professor of anatomy, was the first to identify Trichina spiralis as the source of trichinosis in man.



Robert Hare, who invented the oxy-hydrogen blowtorch in 1801, made a cannon for demonstrating the explosiveness of hydrogen and oxygen that was used in University chemistry classes for many years.

Putting Theory into Practice

"How different is theory from practice! So many people understand things well, but . . . do not know how to put them into practice! The knowledge of such men is useless . . . like having treasure stored in a chest without ever being able to take it out."

This quotation from sixteenth-century historian and statesman, Francesco Guicciardini, is used by James Larkin to illustrate the relationship between theory and practice so essential to his own discipline, education. Dr. Larkin, an associate professor in the Graduate School of Education, describes it as, "a field where a body of developing knowledge is continually tested and informed by practice." Putting this knowledge to use in society, he says, is what brings the "psychic rewards of teaching (that) make it an inviting and noble profession. These come from experiences like helping a five-year-old begin to read . . . or helping a sixteen-year-old discover the world of literature."

As an invaluable national resource of learning and scholarship, the faculty of leading universities such as Penn have the opportunity and the responsibility to put their abilities to use for the enrichment of society. Penn's School of Social Work was created seventy-five years ago to serve the Philadelphia community, and its faculty have long been a voice of social consciousness among the deans and schools of our campus, keeping us all aware of our responsibilities as part of a larger community. "We shall continue,"says Dean Michael Austin, "to build bridges of collaboration with agencies and foundations in the community and the region."

Robert Mundheim, dean of the Law School and former general counsel to the U.S. Department of the Treasury, was awarded the Department's highest honor, the Alexander Hamilton award, for his role in negotiating the freedom of the American hostages during the 1980-1981 Iranian hostage crisis. An internationally known scholar in corporate law and securities regulation, Professor Mundheim also co-authored the freeze of Iranian assets during the hostage crisis as well as the Chrysler Corporation federal loan guarantees.

Emily Livira Gregory became the first woman to teach on Penn's faculty when she took the position of teaching fellow in the department of biology in 1888.

William Labov, professor of linguistics and a founder of Penn's nationally respected Linguistics Laboratory, provided critical testimony that freed a man wrongfully accused of phoning bomb threats to Los Angeles International Airport. The man, an air cargo handler for a major airline, was acquitted on the basis of linguistic evidence supplied by Professor Labov which demonstrated conclusively that the voice on the tape recordings of the bomb threats could not have belonged to the accused.

Ralph Brinster, professor of reproductive physiology at the School of Veterinary Medicine, has been pioneering the use of gene transplantation in animals to unravel the mysteries of how genes are expressed throughout their development. Aside from its potential for enhancing the quality, productivity, and disease-resistance of commercial livestock, this transgenic technology may also revolutionize scientists' understanding of genetic processes and genetically-based diseases in humans, including cancer.

At the Graduate School of Fine Arts, architecture chairperson, Adele Santos, is leading the way in the application of her discipline to the "real world," as she calls it. "I have a very strong feeling," she says, "that the problems we tackle in school must have some kind of basis in reality. I want my students to be aware of the dimensions of the world they live in . . . . For example, the global housing problem is mind-boggling. And we must deal with issues of energy and conservation." A firm believer that her students can play an important role in solving the community's housing and urban design problems, Professor Santos recently became involved with a student design project in a blighted section of North Philadelphia. "I came up with the notion," she explains, "that there was a way to take the unemployment and the vacant land in this part of the city and turn them into something positive."

By putting their special knowledge and expertise into practice, the faculty of leading universities are in a unique position to reap the "psychic rewards" of which James Larkin speaks. University faculty can even shape the perspectives through which society views important issues, as when our School of Veterinary Medicine led the way this year in developing a new sensitivity toward the treatment of animals by establishing the nation's first professorship in Human Ethics and Animal Welfare.

The faculty of a great university are leaders—in the classroom, on the campus, in society. It requires a very special place to provide the scholarly resources, the intellectual stimulation, and the interactive environment they must have to reach their full potential. As we commit to recruiting Penn's faculty of the future, we also renew our commitment to maintaining this University as a place where talented scholars can freely develop and explore their intellectual curiosity and creativity.

In Recognition of Their Accomplishments

Penn's faculty continued to set a standard of excellence in 1986, as reflected by the following list of awards and fellowships:

John Simon Guggenheim Fellowships

Paul Allison, Associate Professor of Sociology

Frank Bowman, Professor of Romance Languages

Drew Faust, Associate Professor of American Civilization

German Gullon, Professor of Romance Languages

Thomas Hughes, Professor of History and Sociology of Science

Gerald S. Lazarus, Professor and Chair of Dermatology

Marjorie Levinson, Associate Professor of English

E. Ward Plummer, Professor of Physics

Janice Radway, Associate Professor of American Civilization

Gillian Sankoff, Professor of Linguistics

Robert Zurier, Professor of Medicine and Chief of Rheumatology at the Hospital of the University of Pennsylvania

MacArthur Fellowships

Nancy Farriss, Professor of History

David Rudovsky, Visiting Associate Professor of Law

Leo Steinberg, Benjamin Franklin Professor of Art History

Presidential Young Investigator

Patrick Harker, Stephen M. Peck Term Assistant Professor of Decision Sciences

Fulbright Scholars

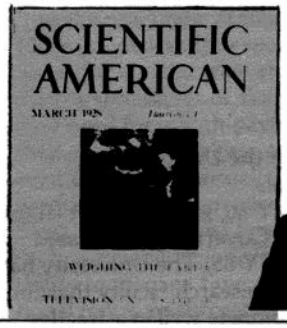
Setha Low, Associate Professor of Anthropology

Jack Nagel, Associate Professor of Political Science

Penn Faculty

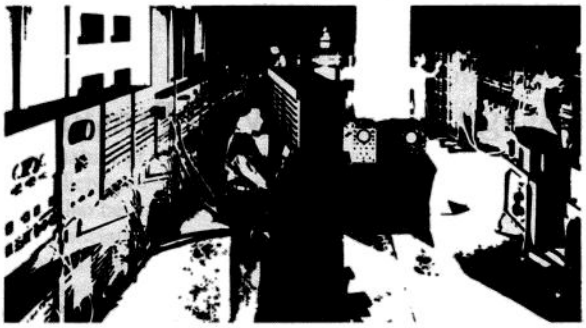
Vignettes from the Twentieth Century

Research and development of the photoelectric cell by Penn professor Herbert E. Ives led to the first public television transmittal on April 7, 1927.

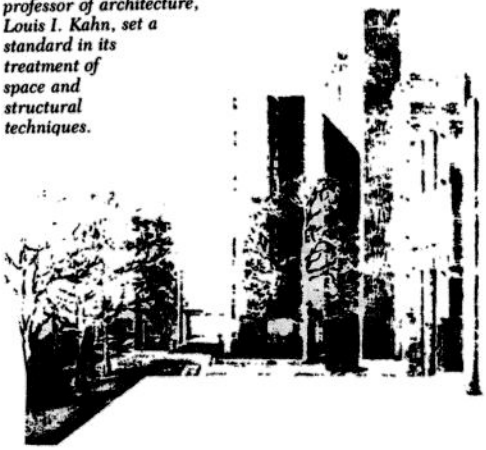


The discovery in the 1930s by Penn biologist David Goddard that protein structures can be broken down and reformed into new configurations led to, among other things, the "permanent wave" in hairstyling.

The introduction of the first large-scale, all-purpose, electronic digital computer, ENIAC, at the Moore School of Engineering in 1946 marked the dawn of the computer age.



The Alfred Newton Richards Medical Research Building, designed by professor of architecture, Louis I. Kahn, set a standard in its treatment of space and structural techniques.



Quotation of the Day

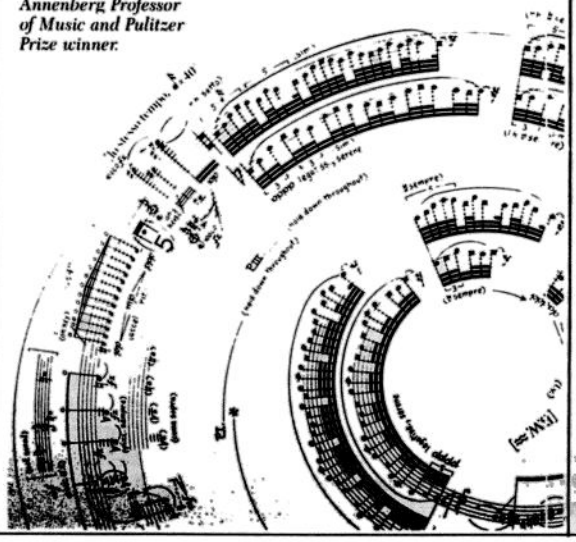
— Professor Erle Leichty, co-editor of the world's first Sumerian dictionary. [A14:5.]

The massive project of compiling the world's first Sumerian dictionary was initiated by Ake W. Sjoberg, Clark Research Professor of Assyriology.

Drew Faust, professor of American civilization, received a Guggenheim fellowship this year to explore the Confederate identity before and after the Civil War.

The work of Penn biologist Andrew S. Binns in regenerating tobacco plants from isolated cells has provided an important step toward genetically engineered crops.

This "Spiral Galaxy (Symbol Aquarius)" is from Makro Kosmos *by George Crumb, Annenberg Professor of Music and Pulitzer Prize winner.*



Ruzena Bajcsy is the founder of Penn's General Robotics and Active Sensory Perception Lab, where research is being done to develop intelligent robots.

A Message from the Vice President for Finance

Overview

The University of Pennsylvania was founded in 1740 as a charity school for the purpose of instructing poor children for free. It was initially located in a single building at 4th and Arch Streets in Philadelphia.

Penn has made substantial achievements since its modest beginnings in 1740. The University is now the largest private employer in Philadelphia and occupies 276 acres and 116 buildings in West Philadelphia. The replacement value of the physical plant is over $2 billion and the annual operating expenditures are in excess of $800 million. The University has made a significant commitment to capital investment in its academic, research, and clinical facilities. Over $250 million of new construction and renovation are currently underway on campus.

Fiscal Year 1986 was the 11th consecutive year that the University had an excess of revenues over expenditures from unrestricted operations. Both the Educational and General and Health Services operations had positive operating results. During FY 86, the fund balances of the University increased $149 million—the largest increase in its history. The total fund balance of the University as of June 30, 1986 is $1.1 billion.

This was a particularly important financial year for the University because, in addition to the positive operating results and important capital investments in the University, long-term financial commitments supporting the University-wide five-year planning process were put in place.

In 1981, the University community began a series of discussions that led to the publication of *Choosing Penn's Future. Choosing Penn's Future* committed the University to a comprehensive planning process that has resulted in a clear definition of the University's priorities and has guided investments in educational and research programs. The three priorities defined in the planning process were: undergraduate education, research excellence, and student financial aid and assistance.

The Undergraduate Education Fund was established in FY 86 to provide support for the development and implementation of initiatives to enhance the undergraduate experience at Penn over the next five years.

During FY 86, a new Research Facilities Development Fund in the amount of $2 million was provided from unrestricted operations for laboratory and other research-related renovations. The University intends to fund this program annually from its unrestricted operations.

Both of these funds represent the allocation of current unrestricted resources toward the support of priorities developed and embraced by the entire University community. The resolve and commitment shown in the creation and implementation of these funds is key to the continuation of the outstanding progress made by the University of Pennsylvania.

Current Operations

Total current funds revenues generated by the University of Pennsylvania from all sources were $848.6 million during FY 86. This represents a 10.3% growth over FY 85 revenues. Revenue form tuition and fees increased 9.6% over FY 85 and continued to provide over 22.5% of the current funds revenues of the University. The University has experienced an increase in the quantity and quality of applicants, at both the undergraduate and graduate levels, over the last several years. It expects this trend to continue and, as a result, expects no erosion in its tuition and fee revenues for the foreseeable future.

Health Services revenues for the University are comprised of the revenue from the Hospital of the University of Pennsylvania, a 700-bed tertiary care facility located on campus, and the clinical patient services revenue of the 1,100 medical school faculty and house staff who practice medicine on behalf of the University. In FY 86, revenues from the Hospital increased 8.5%, while clinical practice revenues increased 14.0%. The Health Services revenues continued to provide approximately 40% of the total operating revenues of the University of Pennsylvania.

During FY 86, grant support from the Federal Government increased 11.8% over FY 85. The University has an excellent research faculty that continues to compete well in attracting funds from the government for its research efforts. This source provided 15.4% of the FY 86 operating revenues.

Health Services operations, student tuition and fees, and U.S. Government grants provide over 76% of the operating revenue of the University. Growth in all three sources of revenue was strong despite the distinct pressures each faced, such as efforts on the part of third party payers to control health care costs, a shrinking pool of college age students, and increasing government efforts to reduce the funding for indirect and direct costs of government research.

Investments and Endowment

The University's Endowment and Similar Funds consist of true, term, and quasi-endowment funds along with life income, annuity, and unitrust funds. During the past fiscal year the balances of these funds increased from $373.9 million to $447.7 million. This $74 million increase consists of realized gains of $40 million and additions to endowment of $34 million (new gifts and reinvestment of income into endowment principal).

As indicated in a Five-Year Review of Investments on page 11, the market value of the University's total endowment has increased from $218 million at June 30, 1982 to $540 million at June 30, 1986. According to the most recent study by the National Association of College and University Business Officers (NACUBO), the University's endowment is among the 20 largest in the country.

Most of the University's true, term, and quasi-endowment is invested in the Associated Investments Fund (AIF), a unitized pooled investment fund which as of June 30, 1986 was valued at $462 million.

The AIF is managed, together with all other University investments, by the Investment Board of the Trustees of

the University of Pennsylvania. The performance of the AIF has been excellent. Recent NACUBO studies indicate that the University's AIF performance has ranked in the top 5% of all university endowment funds over the most recent three- and five-year periods.

In FY 81, the Trustees implemented a spending rule for the AIF in order to protect the endowment against the effects of inflation. During FY 86, $11 million or 38% of total AIF income earned was reinvested. Since the inception of the spending rule policy, $45.6 million has been reinvested, which represents over 9% of the AIF's market value at June 30, 1986.

The outstanding investment performance of the AIF, together with the implementation of the spending rule, has permitted the University to dramatically increase the purchasing power of the endowment. As an example, a $10,000 gift invested in the AIF on July 1, 1981, would have grown over the five years ending June 30, 1986 to a total market value of $21,386 in the AIF. Of this increase in market value, $8,273 would be attributable to appreciation of the basic gift and $3,113 attributable to reinvestment under the Spending Rule. In addition, a total of $3,348 would have been spent for the program purposes of the gift.

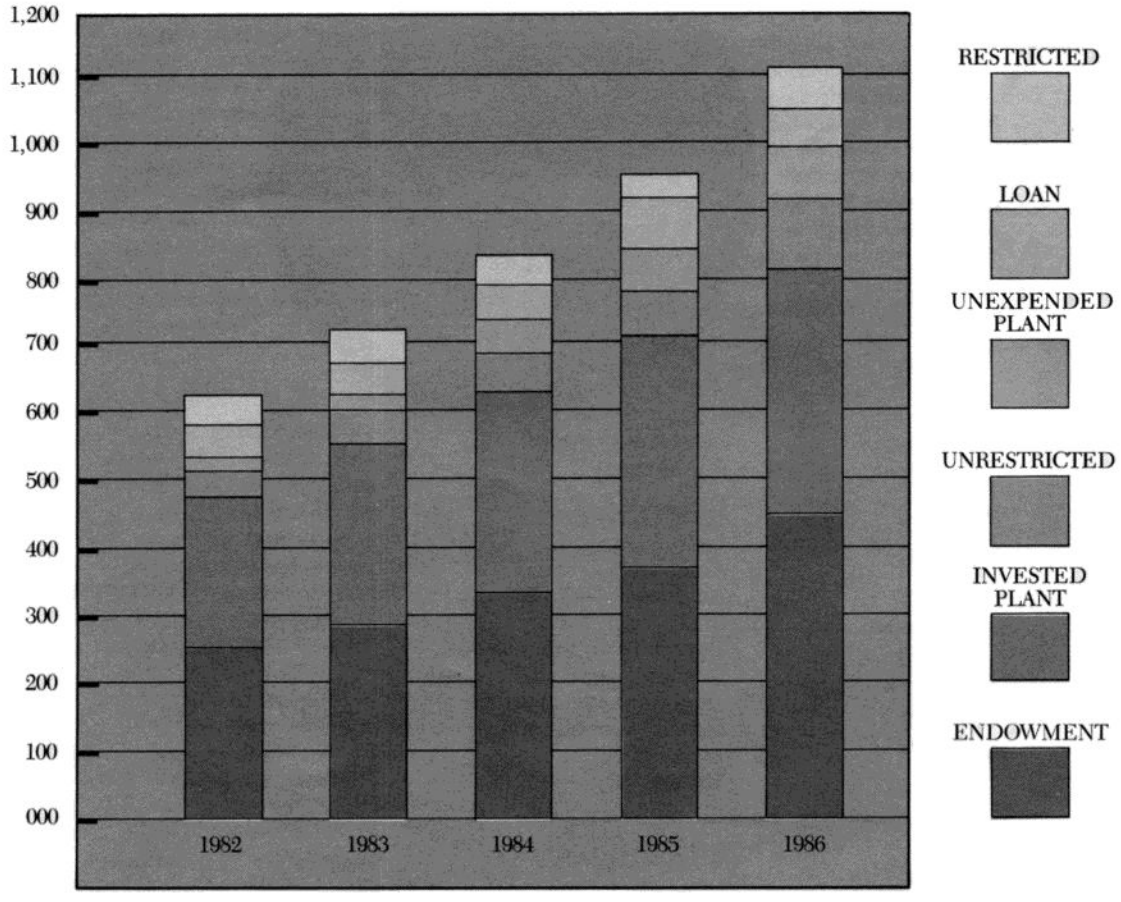
Summary

Fiscal Year 1986 was a productive year for the University of Pennsylvania. The University was able to continue making significant investments in its faculty, facilities, and programs while balancing the budget and increasing its fund balances. The coming year will be equally challenging as the University adapts to tax reform, copes with the continuing pressure to decrease federal expenditures, and continues to invest in the people and programs that make the University of Pennsylvania a very special institution.

—Marna C. Whittington, Vice President for Finance

Five-Year Growth in Fund Balances

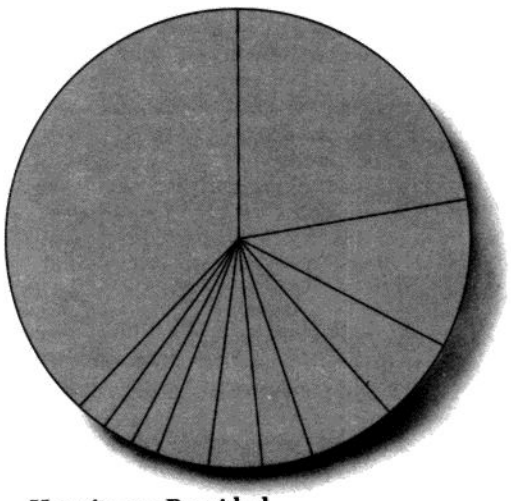
Year Ended June 30 (millions of dollars)



Five Years of Financial Performance

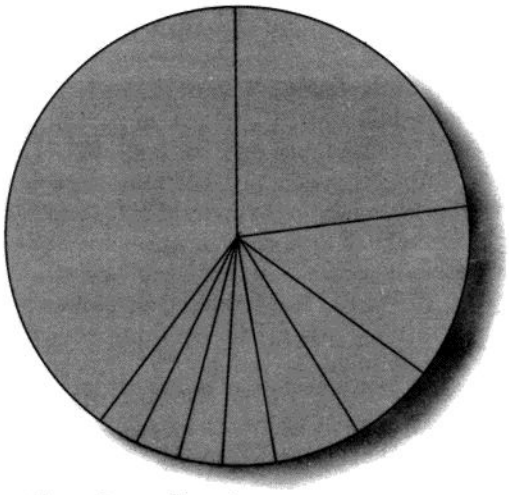
(thousands of dollars)

	1986	1985	1984	1983	1982
Unrestricted:					
Change in unrestricted fund balance:					
Educational and general	**$ 54**	$ 278	$ 298	$ 278	$ 359
Health services:					
University Hospital	**15,826**	9,790	4,406	(2,191)	701
Clinical practices	**1,246**	6,530	11,024	11,252	9,775
Graduate Hospital	**97**	97	97	97	97
Total health services	**17,169**	16,417	15,527	9,158	10,573
	$17,223	$16,695	$15,825	$ 9,436	$10,932
Unrestricted Fund Balance:					
Educational and general	**$ 388**	$ 334	$ 56	$ (242)	$ (520)
Health services:					
University Hospital	**35,082**	19,256	9,466	5,060	7,251
Clinical practices	**61,659**	60,413	53,883	42,859	31,607
Graduate Hospital	**(2,788)**	(2,885)	(2,982)	(3,079)	(3,176)
Total health services	**93,953**	76,784	60,367	44,840	35,682
	$94,341	$77,118	$60,423	$44,598	$35,162
Restricted:					
Net change in restricted fund balance	**$ 2,504**	$ 4,142	$ 6,178	$ (875)	$ 2,557
Net current restricted fund balance	**$48,141**	$45,637	$41,495	$35,317	$36,192



How it was Provided
(by Source)

Health services	39%
Student tuition and fees	22%
U.S. Government grants	15%
Gifts and private grants	6%
S & S auxiliary enterprises	6%
Investment income	4%
Commonwealth appropriations	3%
S & S educational	3%
Other sources	2%
	100%



How it was Spent
(by Source)

Health services	37%
Instruction	21%
Research	13%
Auxiliary enterprises	6%
Student aid	6%
Operations & maintenance	4%
General institutional expense	4%
Other educational activities	4%
General administration	2%
Libraries	2%
Student services	1%
	100%

A Five-Year Review of Current Funds

(thousands of dollars)

	1986	1985	1984	1983	1982
Revenues and Other Additions:					
(by source)					
Tuition and fees	**$190,579**	$173,939	$162,089	$144,451	$126,647
Commonwealth appropriations	**29,667**	26,776	23,914	23,102	21,996
U.S. Government grants	**128,054**	114,424	110,061	96,677	98,157
Investment income	**29,915**	31,992	24,324	19,413	19,016
Gifts and private grants	**53,799**	45,304	44,658	35,212	37,813
University Hospital	**224,628**	207,033	180,258	170,114	140,751
Clinical practices	**104,967**	92,101	82,591	77,329	58,368
Other educational activities	**21,581**	19,072	17,412	22,372	17,276
Other sources	**21,434**	14,642	11,565	6,597	8,210
Auxiliary enterprises	**48,657**	46,317	38,312	34,746	31,604
	$853,281	$771,600	$695,184	$630,013	$559,838
Expenditures and Other Deductions:					
(by function)					
Instruction	**$171,439**	$156,514	$141,183	$126,513	$117,779
Research	**105,461**	88,385	84,464	71,681	72,928
Libraries	**13,472**	11,858	11,173	9,950	8,594
Other educational activities	**32,314**	26,904	24,131	23,642	21,558
Student aid	**48,267**	43,802	40,458	36,590	35,434
Student services	**12,911**	12,014	10,892	9,658	8,328
University Hospital	**208,802**	197,243	175,852	172,305	140,050
Clinical practices	**103,721**	85,571	71,567	66,077	48,593
Operations and maintenance of plant	**34,596**	33,114	30,366	27,589	24,987
General institutional expense	**35,404**	28,457	25,425	24,264	22,652
General administration	**17,590**	15,566	15,217	12,963	10,849
Auxiliary enterprises	**49,577**	51,335	42,453	40,220	34,597
	$833,554	$750,763	$673,181	$621,452	$546,349
Expenditures and Other Deductions:					
(by object)					
Salaries and wages:					
University	**222,447**	203,897	187,293	178,337	165,989
Health Services:					
University Hospital	**95,599**	88,011	80,347	78,480	66,719
Clinical practices	**53,437**	44,392	40,897	38,905	31,175
Total salaries and wages	**371,483**	336,300	308,537	295,722	263,883
Current expense	**439,197**	392,275	347,391	309,041	267,485
Equipment	**22,874**	22,188	17,253	16,689	14,981
	$833,554	$750,763	$673,181	$621,452	$546,349

A Five-Year Review of Investments

(thousands of dollars)

	1986			1985			1984			1983			1982		
	Cost	Market	% of Total	Cost	Market	% of Total	Cost	Market	% of Total	Cost	Market	% of Total	Cost	Market	% of Total
Total Investments:															
Stocks	$174,349	$272,821	29%	$161,010	$226,962	28%	$158,203	$172,586	30%	$123,487	$158,691	39%	$125,345	$120,806	41%
Bonds	260,486	273,284	30%	277,223	285,991	35%	157,237	148,825	25%	106,413	107,295	26%	97,763	79,534	27%
Short-term	357,304	357,335	39%	281,420	281,441	35%	248,885	248,648	42%	128,228	128,240	31%	71,860	70,896	25%
Real estate	8,363	8,363	1%	3,690	3,690	0%	7,966	7,966	1%	8,802	8,802	2%	7,716	7,716	3%
Other	12,975	13,450	1%	12,437	12,567	2%	12,986	12,774	2%	7,480	6,398	2%	12,886	11,742	4%
Total	$813,477	$925,253	100%	$735,780	$810,651	100%	$585,277	$590,799	100%	$374,410	$409,426	100%	$315,570	$290,694	100%
Endowment*	$434,165	$540,084		$364,223	$437,064		$322,568	$329,436		$281,301	$314,654		$241,871	$218,250	
Associated Investments Fund:															
Total	$358,357	$461,806		$290,419	$359,121		$250,466	$260,641		$215,235	$249,251		$177,430	$158,481	
Per share value		389.40			329.90			257.53			270.37			195.64	
Per share income		24.86			25.41			21.81			20.38			19.42	

*True, term, and quasi-endowment only; does not include life income, annuity, and unitrust funds reported in the Financial Statements with Endowment and Similar Funds.

The 32-page *Penn Annual Report 1986*, sent by the President's Office to major donors, trustees and associate trustees, has been condensed in this *Almanac Supplement*. The President's overview of the year appears full-text, as does the main text portion of the Financial Report. Members of the University who wish to examine the full Financial Report may call Barbara Stevens at Ext. 6813.