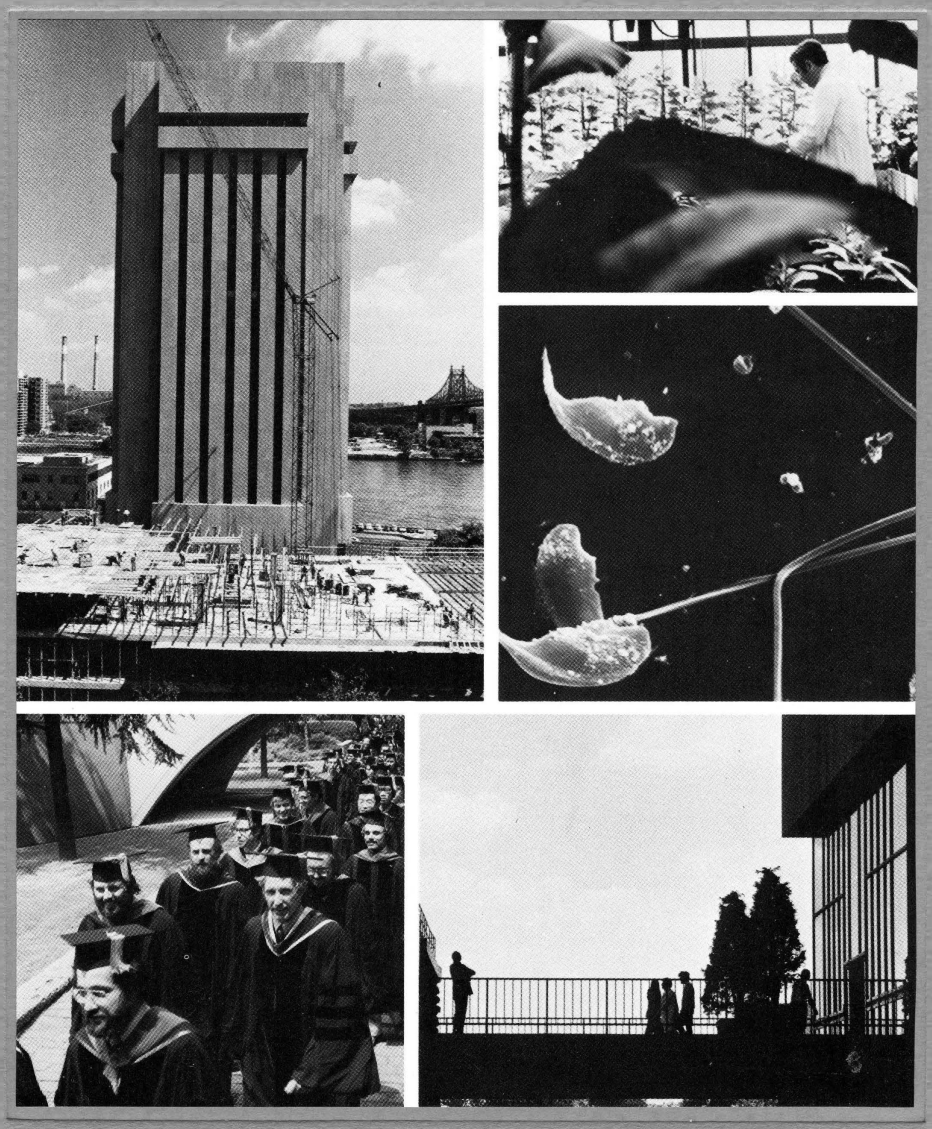
1974

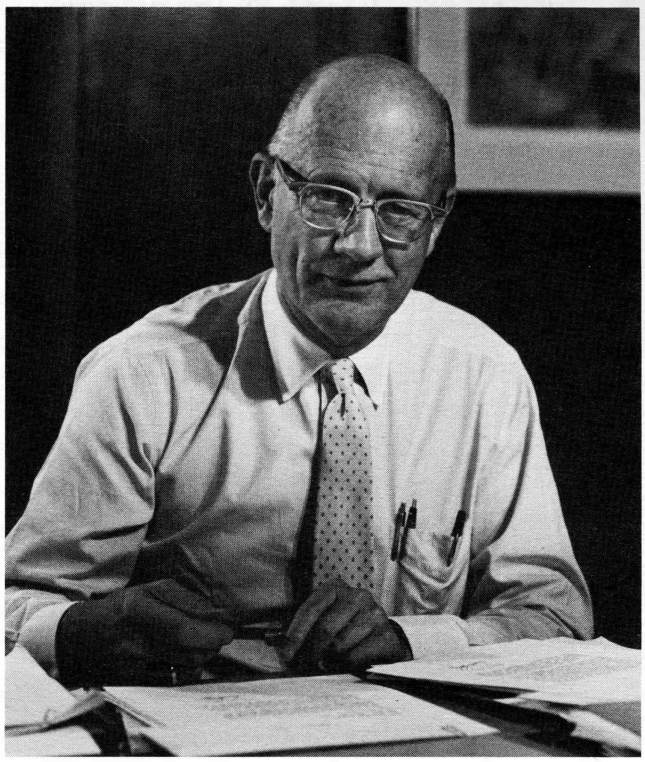
1973-1974 Report of the President

The Rockefeller University



THE ROCKEFELLER UNIVERSITY
REPORT OF THE PRESIDENT · 1973-74

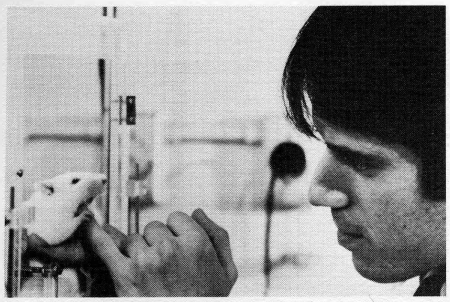
CONTENTS

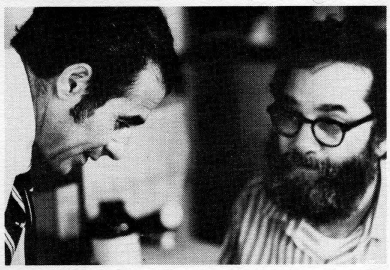


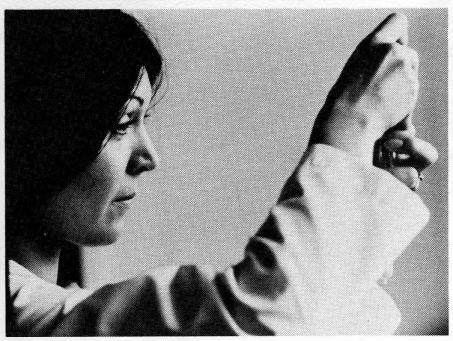
Frederick Seitz, President

A LOOK BACKWARD is sometimes a good way to get a better focus on what's going on around us. I have been reading several of the annual reports submitted by Dr. Herbert Gasser, particularly his 1939 report, four years after he had become director of what was then still The Rockefeller Institute for Medical Research, and his 1951 report, when this institution was about to complete a half century of achievement. The reports still make interesting reading not only for what they tell us of the evolution of research here but also for their insights into the development of the biomedical sciences in this country.

It was under Gasser's leadership that scientists at our insti-







tution—where some of the greatest successes up to then had been in the study of infectious diseases—turned more and more to the exploration of life processes on the cellular level and to the use of new research techniques that broadened and deepened the scope of medical biology. His own scientific interest in neurophysiology, which brought him a Nobel Prize in 1944, led to the introduction at The Rockefeller of research on the structure and function of the nervous system.

One senses in his reports a restless, probing mind alert to the main currents of biological research and the needs of the future. Particularly prophetic are his analyses of the promising future of biophysical research and the need for basic research on illnesses of the mind he so aptly describes as "diseases of behavior." Today the University is increasingly active in the neurosciences—what some call the "brain sciences"—and related fields through research in neurochemistry, physiological psychology, neurophysiology, combined metabolic and behavioral effects involved in certain diseases, and learning and memory in animals and man. Through such fundamental work the biological and behavioral sciences do seem to be merging, as Gasser felt they must, into a unified science of life processes.

"The product of The Rockefeller Institute," Gasser writes at the start of his 1951 report, "is new knowledge," knowledge focused upon the preservation and improvement of health, and upon the prevention and cure of disease. And he goes on to define the institution's mission in these words:

> . . . it is upon path-breaking that the weight of encouragement must be placed, if our purposes are to reach their highest level of fulfillment. Our sights should always be aimed high, with the future and not the present in mind, and the target not just new knowledge, but the kind of new knowledge that has the power to illuminate sectors which are now dark.

Historian George Corner reminds us that Gasser maintained this sense of mission through troubled times not unlike the present when efforts to uphold the research standards of the Institute were subject to financial uncertainties, changing social demands, and the impact of a global war. The difficulty of the problems he faced and his dedication to the highest standards make Gasser's reports thematically reminiscent of today's concerns and helpful in setting the tone for this report on the academic year 1973-74. In my last report, I attempted to define the special nature of the University and its role in the world. In this report, I shall try to make that definition even more specific by emphasizing:

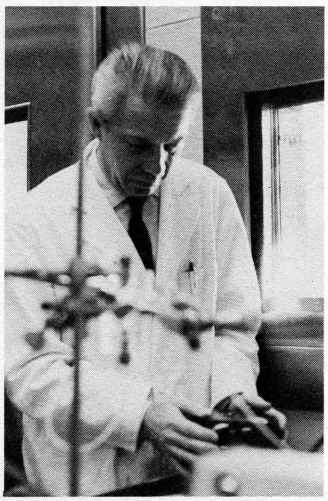
Research programs and developments that illustrate the University's allegiance to its basic mission.

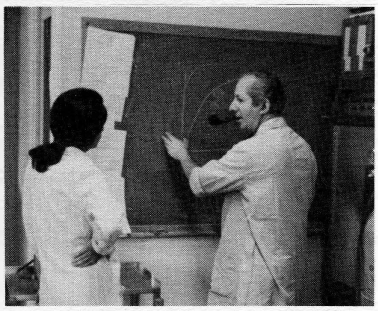
Plans and actions to ensure that the University can continue to pursue that mission and maintain its high standards.

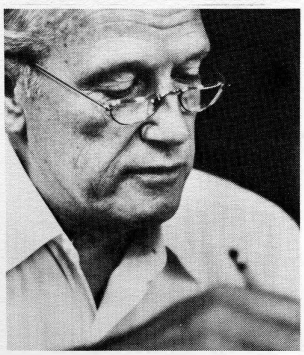
Two ongoing programs — related to cancer and reproductive biology — furnish vivid examples of our University's research style and of its continuing effectiveness in serving long-term national health goals. In both instances, the University is utilizing its scientific strengths and unusually free and flexible organization to enlarge the base of fundamental knowledge — "illuminating sectors which are now dark" — and to help solve two of the major problems confronting the world.

Research Relevant to Cancer

OUR UNIVERSITY does not envision itself as primarily a cancer center, but in effect, the very nature of the problem made us one long before the federal government began to use such labels. The cancer problem is a problem of life itself — the mystery of growth and the factors that, ever more frequently in the modern world, cause the cell's regulatory processes to go out of control.



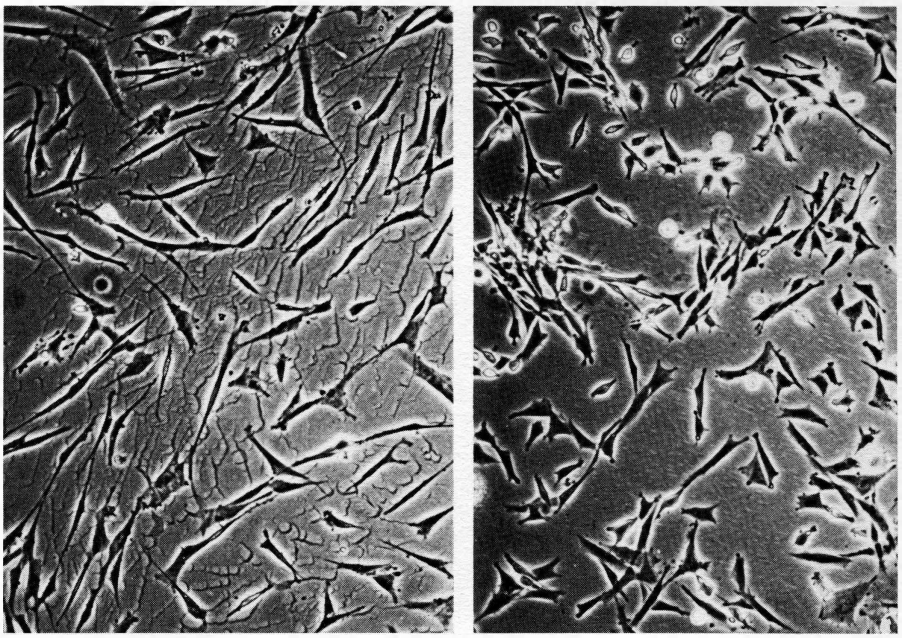




Although we have no tightly administered and sharply "mission-oriented" cancer research program, more than 15 of our laboratories are concerned with fundamental questions directly relevant to discovering the causes of cancer. This includes sustained pioneering work on tumor viruses, on the structure and function of the cell membranes that are critical for understanding how aberrant cells function, and on the genetic controls and immunological defenses that affect the body's natural responses to tumors.

Each laboratory independently designs its own research program, but a natural overlapping of the various disciplines in a free scientific atmosphere fosters a variety of experimental approaches to problems of the basic biology of cancer. Although there is still a long way to go in this work, many scientists agree with the observation of Nobel laureate James Watson that "important new facts are emerging at an ever increasing tempo and it will be most surprising if something dramatic does not break soon." Watson, the director of the Cold Spring Harbor Laboratory, went on to say in his own report for 1973 that "there is a good chance that one such event has already happened. This is the observation of Edward Reich and his collaborators at The Rockefeller University that virtually all highly malignant cells continuously release from their surfaces a highly specific enzyme that they call the cell factor." The implications of this lead to tracing the ways in which normal cells become cancerous are not only being vigorously explored by Reich and his colleagues, but they have also stimulated great activity elsewhere.

One clear indicator of the pertinence and high quality of the University's approach to basic research in the many fields bearing on cancer is the success of our scientists in obtaining, on a highly competitive basis, cancer-related research grants totaling about $1 million in 1973-74. In addition, as I reported last year, The National Cancer Institute is providing $1.7 million of the $10 million estimated as the total needed to cover construction



Microscopic photographs illustrate a chemical difference, identified by the laboratory of Professor Edward Reich, between normal and cancer cells. Photo on left shows fibrin (wavy lines) in presence of normal cells. In photo on right, fibrin is no longer visible. It has been "digested" by a culture of malignant cells.

costs and endowment for operating expenses of our new animal care and research center now being built at the south end of the campus. When completed in 1975, this modern animal center will greatly enhance the efficiency and increase the scale of the University's cancer-related research, which depends heavily upon studies of experimental animals. Another benefit will be an improvement in the training of doctoral candidates—in both the University's Ph.D. program and the new joint M.D.-Ph.D. program with Cornell University Medical College—and post-doctoral investigators in cancer-related problems requiring animal models.

Under construction: new animal care and research center.

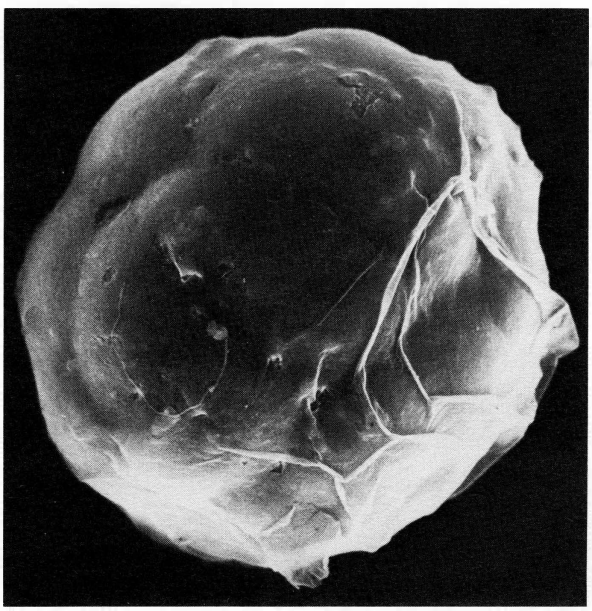
It is no accident that the Rous sarcoma virus still figures prominently in the reports of many scientists engaged in cancer-related research. In a series of revolutionary discoveries at this institution between 1909 and 1914, Peyton Rous established a virus as the cause of chicken sarcoma. The mainstream of cancer research today stems from this first unequivocal linkage of virus and cancer—a discovery for which Rous shared a Nobel Prize—and several laboratories at the University are carrying on his tradition of distinguished research in cancer virology. Rous's entire career justified his belief that the scientific exploration of the most basic questions posed by nature was bound to produce answers relevant to human needs.

Reproductive Biology Program

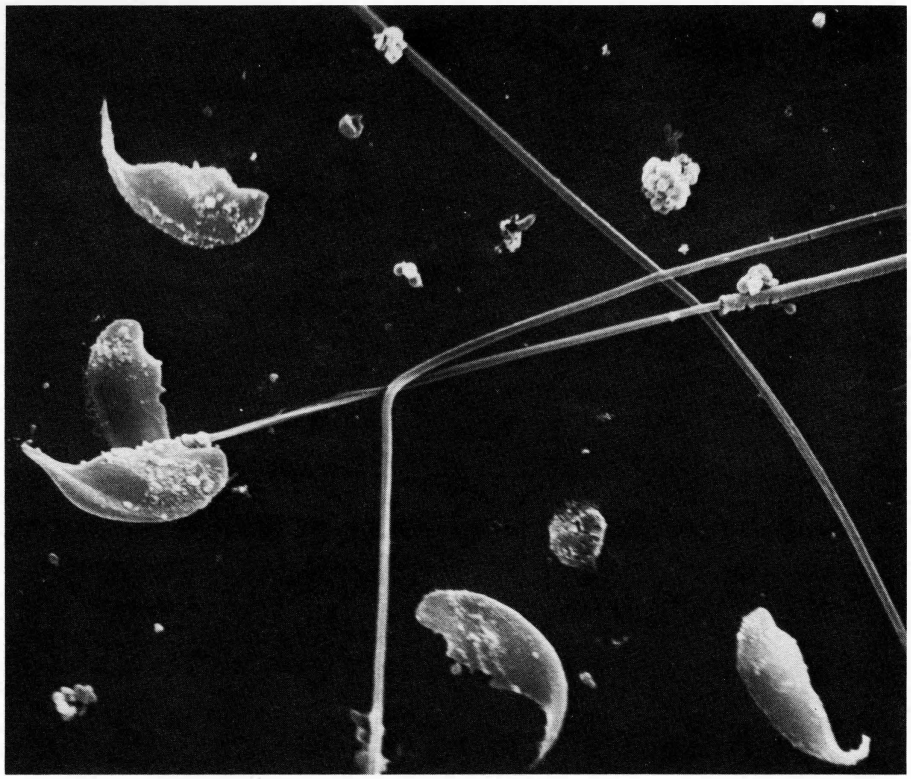
THE SAME BELIEF motivates our program of research in reproductive biology. Indeed, this program provides a good example of how the University's unique organization and great resources in the basic sciences have permitted us to focus on one of the major biological and social problems of our time.

Of the many such problems which face us, it would appear that population control could be dealt with most successfully through large-scale programs with very specific goals. To a certain extent this supposition has been correct. The development and application of birth control devices and chemicals, public education in the control of family size, and appropriate political and social actions, all represent practical approaches which have been necessary and useful.

But the problem of population control is clearly too complex to be resolved by the widespread application of the existing scientific knowledge. The problem has very deep roots in the fundamentals of biology, chemistry, and the behavioral and so-



Sea urchin embryo, as seen by scanning electron microscope.



This scanning electron micrograph illustrates the removal of mitochondria from mouse spermatozoa by treatment with dithiothreitol and the cleavage of sperm heads from tails by exposure to trypsin.

cial sciences. Its clarification will require intensive basic study of a wide range of cellular processes in animals and man, including many phenomena seemingly distant from the reproductive events themselves.

The breadth and depth of the biological problems inherent in reproduction research are reflected in the spectrum of studies being carried out in the University's program. These include the analysis of molecular mechanisms by which sex hormones initiate and control the orderly, but immensely intricate, interplay of cell processes involved in embryonic development; an exploration of the manner in which the several varieties of pituitary cells interact and secrete their protein hormones; attempts to gain insight into the immunological mechanisms involved in the remarkable ability of the fetus to survive as a foreign "graft" within the potentially hostile maternal immune system; charac-

terization of the molecular constituents of spermatozoa in order to define those components that relate to the specialized functions of these cells; and study of the manner and mechanisms by which sex hormones regulate neural activity, exert "organizing" influences with respect to the sexual differentiation of reproductive function and, ultimately, control reproductive behavior.

The high intellectual interest and social importance of these problems, coupled with our awareness of the unique scientific resources we could bring to bear in this area of research, prompted us to develop this new program three years ago. We had three broad goals:

> To coordinate and strengthen our existing research activities in this field and expand into promising new areas of investigation.
>
> To provide a strong counterpart, in the fundamental sciences, to the excellent physiological and epidemiological programs maintained by our able colleagues at the Biomedical Division of the Population Council on campus.
>
> To develop a stronger training program for predoctoral and postdoctoral associates, a program which would bring into the field of reproduction research young new investigators, who we hope will remain in the field and will contribute answers to the great range of biological questions that are ripe for study.

Though the program is still relatively new to the University, I believe we have made significant progress toward each of our goals. Progress may be measured by the increasing number of University laboratories participating in the program and by the growing number of young scientists undertaking studies in this field. We have received basic support for this effort from private sources—notably The Rockefeller Foundation and the Scaife Family Charitable Trusts—and from federal research sponsors.

We continue to seek ways in which the scientific strengths of the University can be applied to appropriate problems in this field. Particularly as our private support grows, we will gain even more freedom to extend our efforts along promising new lines.

Clinical Investigation and the Hospital

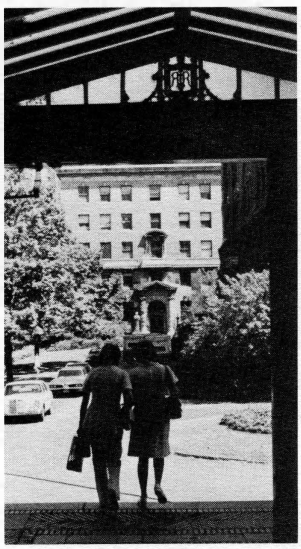
ANY DISCUSSION of how basic research at our University is constantly reorienting itself to human needs must inevitably focus on our small but remarkably productive Hospital—the first in this country dedicated exclusively to clinical investigation and, in relation to its size, the most successful in training those young medical scientists who have become the leaders in American academic medicine.

The "smallness" of the 40-bed Hospital is intentional, reflecting the clear perception of our faculty that medical research at the University should focus intensively on fundamental mechanisms of major disease processes and that research carried out directly in humans will, therefore, represent only a fraction of the total investigative effort in medicine. Moreover, clinical research requires a faculty that not only has a deep comprehension of the basic chemical and biological sciences, but also possesses to the highest degree the professional competence and personal qualities we all consider inherent in the title "physician." The number of clinicians who can meet such qualifications is small, and the mounting pressures on medical schools to participate in the large-scale delivery of patient services suggest there will be a further decline in this number. One of our most important goals is to maintain strong programs of medical research and of education in the clinical sciences.

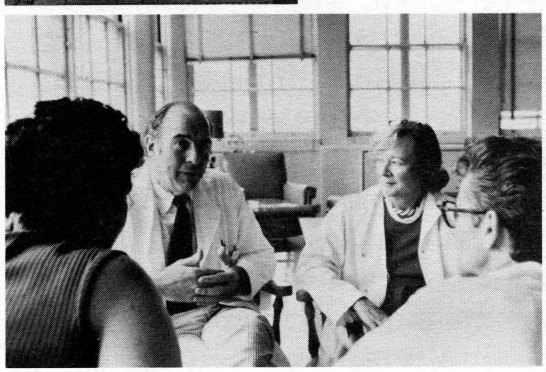
Dr. Gasser, in his 1939 report, observed that although the Hospital was organized in 1910, nine years after the founding of the Institute, "it sets a mark upon the Institute which unmistakably identifies it as an institution for medical research and

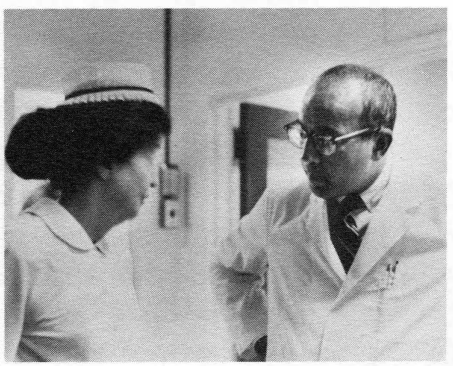
keeps the purpose at all times sharply in focus." I find it so today as well.

As the interests of the University have broadened and deepened in all branches of the basic life sciences, so too have investigators in the Hospital delved more deeply into a wide range of biological and behavioral questions in their efforts to understand human disease. The hospital laboratories are as much oriented to basic research as are the other University laboratories, but there is the added dimension of constant contacts with patients. The University Hospital pioneered in correlating the study of human disease at the bedside with investigation in the laboratory. As this type of activity has increased in other medical institutions, the program at this University has retained an unusual and rather special approach, partly because of a unique organization that departs from the traditional departmental structure of the medical school. This approach provides for continuity and great productivity in the investigations of specific diseases and has led to a pattern characterized by long-term studies of the most difficult problems in understanding the causes of disease.



The Hospital's programs represent an extraordinary array of research efforts in the study of human diseases. Some 30 to 40 well-defined diseases are under investigation. They are largely



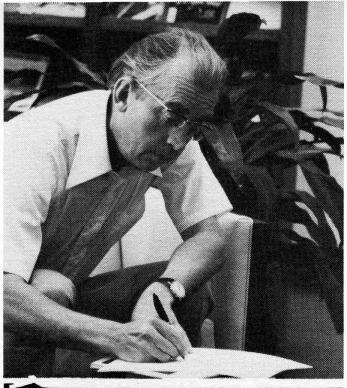


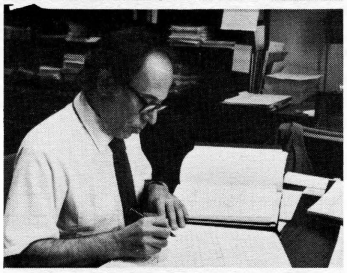
chronic and degenerative in nature. Overall, they constitute a major portion of the disabling and lethal afflictions to which mankind is presently subject and for which there are no wholly satisfactory means of prevention and treatment. Specifically, they range from rare genetic disorders such as the porphyrias and the somewhat more common hereditary disease, sickle cell anemia; to environmentally acquired disorders such as lead poisoning; to a wide variety of immunological disorders; to the recent epidemics of gonorrhea and meningitis; to the widespread problems of obesity, arteriosclerosis and heart disease, and drug addiction. In every case, the University's staff has made major contributions to medical understanding.

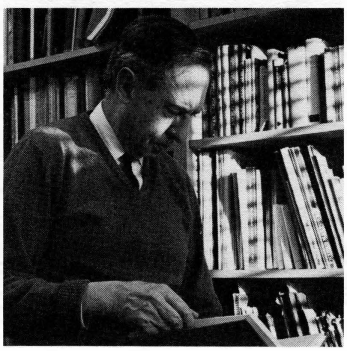
A University of the Sciences

AT THIS POINT I am reminded of an educator's remark regarding another institution of learning, that he would like to see it become a "Rockefeller University of the humanities." This gratifying recognition enables me to make the point that in the transition from Institute to University—so ably administered by my predecessor, Detlev Bronk—The Rockefeller did become, in spirit rather than size, a university of the sciences.

As I have noted in an earlier report, this University has not swerved from the conviction that it should concentrate on the life sciences and the related behavioral sciences. Nevertheless, our institution would not be a true university of the sciences without mathematics and physics programs of the highest quality. We should not lose sight of the contributions made to basic scientific knowledge and to our University by our mathematicians and our experimental and theoretical physicists. Their presence reinforces the spirit of intellectual adventure and the rigorous standards that pervade our community of scientific research. They help to reduce the formidable barriers of disciplinary language that inhibit communication between those







working at the outermost limits of physics and biology today, and they enhance the opportunities for interdisciplinary ventures involving both faculty and students.

Even as I was working on this report, the international press headlined the importance of the research being done by our experimental physicists in deepening our understanding of the constitution of matter. The news stories described the results of bombarding protons and neutrons, the basic constituents of atomic nuclei, with six different types of very high energy subparticles produced by the new Fermi National Accelerator Laboratory in Batavia, Illinois. The participating physicists believe that the findings are an important step toward a complete understanding of the fundamental force that binds together particles of the atomic nucleus. The experiment was carried out, in collaboration, by teams from the Brookhaven National Laboratory, the Fermi Laboratory, and The Rockefeller University. The University's team was headed by Rodney L. Cool and included Orrin D. Fackler.

Maintaining Our Greatest Resource

I HAVE BEEN DWELLING largely on the strategy and fruits of research at The Rockefeller University, and though implicit in all this is the point that good research requires good people, I want to turn for a moment to a consideration of some of the steps we are taking to maintain our greatest resource. As previously reported, the highest priority objective of our $118 million Development Program, which has passed the $40 million dollar level in private gifts and grants, is additional funds for the endowment of professorships and postdoctoral and predoctoral fellowships. I am glad to note that our donors, listed at the end of this report, have responded generously to this need.

This year, Gerald M. Edelman was named to the first of two professorial chairs established under a grant from The Vincent

Astor Foundation. Professor Edelman shared a Nobel Prize in 1972 for his work on gamma globulin, the key molecule of immunity. The second professorship will shortly be set up under the grant, which is designed to aid senior scientists whose past work and planned investigations relate to fields basic to achieving a deeper understanding of how to treat and prevent cancer.

Also filled this year was a professorship established under a grant from the Andrew W. Mellon Foundation in support of the University's programs of research and advanced training in cellular biology and experimental pathology. The first to hold this chair is Christian de Duve, who joined our faculty in 1962 and is best known for his discovery of lysosomes, cell organelles containing digestive enzymes powerful enough to break down most of the building blocks of living matter. In recent years, his research on subcellular particles has drawn him into a number of different areas of cell biology and pathology, including the mechanisms involved in arteriosclerosis and aging.

One of my happiest duties this year was the appointment of Frank Brink, Jr., as Detlev W. Bronk Professor. In that post, he succeeds one of our most distinguished faculty members, Nobel laureate H. Keffer Hartline, who became professor emeritus this year. Dr. Hartline was the first to hold the Bronk Professorship, which was created in 1972, through part of a gift from the Chairman of our Board, David Rockefeller, to honor the many contributions of President Emeritus Bronk to the development of the University. Dr. Brink, who served as dean of graduate studies from 1957 to 1972, has long been associated with Dr. Bronk in research on the biophysics and biochemistry of nerve cells. Dr. Bronk was instrumental in bringing both Dr. Hartline and Dr. Brink to our campus and developing the strong research program in biophysics envisioned earlier by Dr. Gasser.

I should like to mention here two other professorial appointments that will add depth to our faculty. Effective July 1, 1974,

James E. Darnell, Jr., joined us as professor of molecular cell biology. James Glimm will join us in August as professor of mathematics. Dr. Darnell, whose major research is in the area of gene expression in higher cells, a field central to modern cancer studies, comes to us from Columbia University where he has served as professor of biological sciences since 1968 and department chairman since 1971. Dr. Glimm, professor of mathematics at the Courant Institute of Mathematical Sciences of New York University, is internationally recognized for his work in mathematical foundations of quantum field theory, and he will greatly enhance our strength in mathematical physics.

Support for Young Scientists

THE MOVES to strengthen the endowment of senior faculty positions, through our Development Program, have been paralleled by efforts to strengthen the University's ability to support young scientists embarking on promising careers. Under the Program in Reproductive Biology, reviewed earlier, a number of talented young investigators have been added to the faculty. Among the first to be appointed was William H. Beers, a 1970 graduate of the University, who returned to the campus from the University of Illinois, where he had held a two-year postdoctoral fellowship awarded by The Rockefeller Foundation after a national competition.

A similar program — to seek out and support deserving young researchers in basic cell biology, experimental medicine, and related fields — is being carried out under our grant from the Andrew W. Mellon Foundation. The first three fellowships were awarded to Norton B. Gilula, Paul M. Lizardi, and Frank R. Landsberger.

I commented at some length last year on the availability of suitable housing as a factor in the recruitment and retention of younger faculty members — a problem of long standing, as wit-

ness Dr. Gasser's rueful comment in 1939 that "the privilege of working in the Institute must be paid for by the acceptance of living quarters inferior to those which would be available in a college town." We should make a significant advance in solving this problem when our new apartment building—now rising rapidly at 63rd Street and York Avenue—is ready for occupancy in 1975.

The Economic Climate

FOR AN ADMINISTRATOR necessarily sensitive to the economic climate, two laconic sentences in Dr. Gasser's 1951 report have particular resonance: "At the present time our income is at a peak in numbers of dollars, but not in purchasing power. Every year, handsome additions are made to the budget in order to stand still."

Fiscally speaking, 1973-74 was a year of belt-tightening and economic worries for all private research and educational institutions. This University was no exception. Continuing inflationary pressures, compounded by an unexpected tripling in the cost of fuel oil, have posed a grave budgetary problem. Another factor in this economic squeeze is the large increase in the amount we must pay into the social security system as a result of recent legislation mandating increased benefits. As one industry after another has felt the impact of inflation and the energy crisis, all costs have risen. Just to take one small example of the pervasive pattern, the University's telephone bill increased, from 1973 to 1974, by 13 percent for the same services. Overall, the rise in the cost of living in the New York metropolitan area has exceeded 10 percent in the past year. You can imagine the effect on the University's goal (based on an assumed annual inflation rate of 5 percent) of reducing its deficit to $850,000 by June 1974 and to $500,000 by July 1975. We have had to enlist the cooperation of the entire campus community in holding the line on costs in

Under construction: new apartment building.

order to limit the 1973-74 deficit to $2 million.

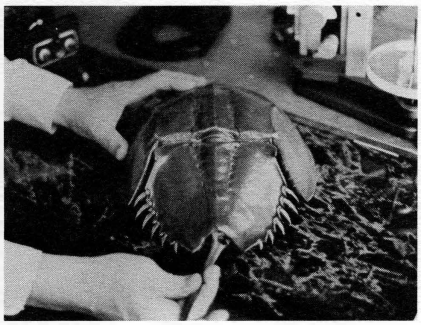
Everyone on campus has felt the pinch, and I am troubled about every one of the economies we have had to make. But the people in all positions who make up this University have risen to the challenge and have already achieved impressive savings. While the immediate prospect is not "bullish," I believe we can weather the current imbalances in our economy without significant effect on the basic programs or the essential character of the University.

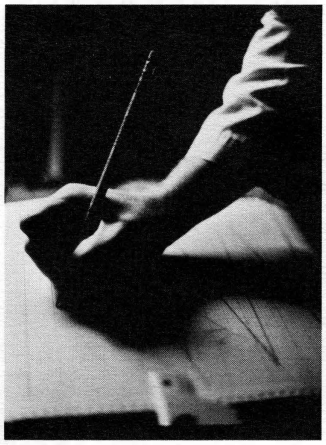
Strengthening Planning Procedures

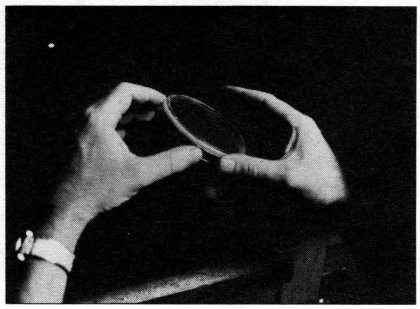
AS I REPORTED last year, two committees chaired by members of our Board of Trustees have already provided long-range guidelines for the University's research and educational development and an analysis of its financial resources. Building on these reports, a third group — the Committee on Program Planning and Resource Allocation headed by Trustee Patrick E. Haggerty — submitted a set of recommendations this spring looking to a "regularly followed set of policies and procedures which assumes constant examination of goals and objectives and the matching of available resources against them so as to emphasize RU's major missions in research and education." Although present financial strains lend urgency to these recommendations, we have been concerned for several years with finer tuning, if you will, of the administrative process of evaluating overall economic trends and the implications for University financing. In this endeavor — balancing our aspirations and resources — I have enjoyed an enviable degree of informality in working with trustees and faculty. I intend to continue to improve our regular procedures for program planning and budgeting without imposing any bureaucratic devices that are so alien to the style of this University.

The Rising Cost of Science

THE MAJOR CONCERN of all of us, including our Board of Trustees, is to maintain the independence and high standards of the University. This effort is becoming more and more expensive. The unit cost per investigator keeps rising as the necessary expenses of supporting staff, laboratory space, and equipment all increase. In short, the cost of research is rising more rapidly than the cost of living. Moreover, it would appear that in the years immediately ahead a smaller percentage of the Gross National Product will be going into basic science; thus, federal research budgets may not even keep pace with inflationary increases.







Because of all these factors, I have a strong feeling that the country will witness a significant contraction in the number of people doing "good" science.

In such circumstances, The Rockefeller University should stand out more than ever if we avoid unnecessary expansion, use our discretionary funds to finance the highest quality, and increase our private support from many sources, large and small. By and large, I believe the University—now numbering approximately 110 predoctoral students, more than 150 postdoctoral trainees, 195 regular faculty, and about 900 supporting staff—has grown as much as it should at present. Even if the economic picture were much more favorable, most of us would continue to favor a dynamic steady state with natural expansions and contractions of programs.

The message of the times seems clear. We can remain independent and best in what we do only if we remain relatively small. However, this is far from saying that there can be no growth in areas where the circumstances are ripe for new ventures into the unknown. There has been such growth recently, and there will be more such carefully guided growth in the future. None of us would jeopardize the continuity of the University's tradition of service to mankind.

I am optimistic enough to believe that, in the words of Dr. Gasser, "the rate of appearance of opportunities" for our scien-

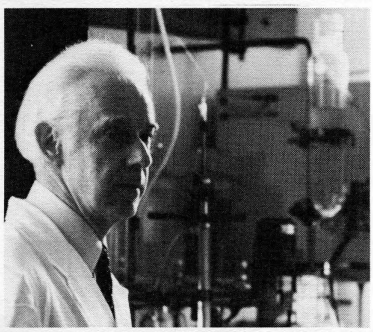
tists will not decelerate. It is the responsibility of all of us—by prudent management and enthusiastic solicitation of new sources of support—to prevent any deterioration in our ability to follow up on these opportunities. For only with the new private funding envisioned by our Development Program, can we attain the broad base of support needed to maintain the University's independence and tradition of excellence. We take pride in the evidence that as our donors become better acquainted with our campus, our people, and the work of our laboratories, their respect for The Rockefeller University grows and their realization of its worth to the world deepens.

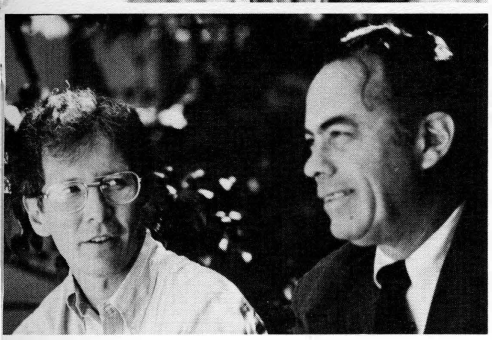
The Momentum of a Tradition

THE MOMENTUM of a tradition is best maintained by example and the influence of one generation on another. For this reason, some of our deepest moments of appreciation are also the saddest. Two such moments occurred this year: on June 20, 1974, with the death of Alfred Mirsky and on July 7, 1974, with the death of Lyman C. Craig.

Dr. Craig, a biochemist, gained worldwide recognition for his development of the countercurrent distribution technique for the separation and identification of biologically significant compounds. In laboratories all over the world, his method has been particularly useful in the isolation and study of substances such as the synthetic antimalarials, antibiotics, hormones, and proteins. The American Chemical Society, in conferring on him its Fisher Award in Analytical Chemistry in 1965, noted: "Many of the important advances made in biochemistry in the past several years would not have been possible without Dr. Craig's technique." We at Rockefeller University will remember him not only as a leader in his field and an inspiring colleague, but also as a warm and gentle human being.

Dr. Mirsky first came to the University in 1927 and won





acclaim as a pioneer in unlocking the secrets of the cell nucleus. His outstanding achievements were the isolation, for the first time, of the genetic material of mammalian cells and the demonstration that every cell in the body has the same amount of DNA as every other cell except for the sperm and egg cells, which have half the amount. This work looked back in the history of research at Rockefeller to the identification of a ribonucleic acid by Phoebus Levene in 1910 and the internationally acclaimed demonstration by Oswald T. Avery, Colin M. MacLeod, and Maclyn McCarty in 1944 that DNA is the substance that transmits hereditary information. Today former associates and students of Dr. Mirsky are exploring on several fronts the territory opened up by his work. Scientist and humanist, Dr. Mirsky served our institution well in many roles, not least as a leader in the restructuring of The Rockefeller Institute into the University of today.

The careers of these two scientists—each of whom spent more than four decades at this institution—are links in a great tradition and testify to the force of continual inquiry: "the attack by successive generations of investigators bringing new ways of thinking and new tools of research to the persistent study of nature's problems."

One of our most respected senior scientists has said that most of all a successful scientist has to be an optimist and an enthusiast. "I don't know any pessimists in science. If you keep saying to yourself something isn't going to work, you'll never find anything. And you've got to love it if you're going to stay in it. So, you'll find most scientists are very enthusiastic about what they're doing."

This is the conviction I have tried to communicate in this report. A look backward and a look around reassure me that the past and present of The Rockefeller University are the best omens for a promising future.

Donors to The Rockefeller University Development Program As of June 30, 1974

Deepest appreciation to the following donors of $1,000 and more:

INDIVIDUALS

Mrs. Vincent Astor
Mr. Philip Bard
Mr. C. W. Cook
Mr. Richard W. Courts
Mrs. Virginia C. Courts
Mr. and Mrs. Thomas G. Cousins
Eli Whitney Debevoise, Esq.
Mr. and Mrs. J. Richardson Dilworth
Mr. Oscar Dystel
Friend of the University
Dr. Harold Gershinowitz
Mr. and Mrs. Patrick E. Haggerty
Mr. Christian A. Herter, Jr.
Mr. Denison B. Hull
Dr. and Mrs. Mark Kac
Dr. Lindsley F. Kimball
Mr. and Mrs. John E. Lockwood
Dr. and Mrs. Maclyn McCarty
Mr. Albert L. Nickerson
Mr. David Rockefeller
Mr. David Rockefeller, Jr.
Mr. Walter N. Rothschild, Jr.
Mr. Melvin R. Seiden
Dr. and Mrs. Frederick Seitz
Mr. and Mrs. William K. Simpson
Mr. Robert G. Stone, Jr.
Mrs. Arthur Hays Sulzberger
Mr. Edwin C. Whitehead
Dr. and Mrs. Eugene P. Wigner

FOUNDATIONS

ARCS Foundation
The Vincent Astor Foundation
Baer Foundation Inc.
The Frederick W. Beinecke Fund
The Burroughs Wellcome Fund
Carnegie Corporation of New York
Mary Flagler Cary Charitable Trust
The Courts Foundation
Booth Ferris Foundation
Max C. Fleischmann Foundation
General Services Foundation

Goldhirsch Foundation
Grant Foundation
S.T. and M.D. Harris Foundation
Charles Hayden Foundation
The Howard Johnson Foundation
The Bertha Koempel Foundation, Inc.
The Kresge Foundation
The Lincoln Fund
Brooks and Hope B. McCormick Foundation
Andrew W. Mellon Foundation
Richard King Mellon Foundation
Charles E. Merrill Trust
The Andre and Bella Meyer Foundation
Edward S. Moore Foundation, Inc.
William S. Paley Charitable Trusts
The Perkin Fund
Rockefeller Brothers Fund
The Rockefeller Foundation
Scaife Family Charitable Trusts
Schiff Foundation
David Schwartz Foundation
Seiden & deCuevas Foundation
The Shubert Foundation, Inc.
Alfred P. Sloan Foundation
The Spencer Foundation
Gustav Stern Foundation, Inc.
The Sulzberger Foundation, Inc.
Surdna Foundation
Tudor Foundation
Harry Winston Foundation, Inc.

CORPORATIONS

The Chase Manhattan Bank, N.A.
Equitable Life Assurance Society of the United States
Exxon Corporation
Merck and Co., Inc.
Metropolitan Life Insurance Co.
Mobil Oil Corporation
Morgan Guaranty Trust Company
New York Life Insurance Co.
New York Times Foundation
Ogden American Corporation
Prudential Insurance Co. of America
The Rapid-American Corporation
Squibb Corporation
Texas Instruments Foundation

BEQUESTS AND MEMORIAL FUNDS

Estate of Aaron Becker
Estate of Frederika Con
Estate of Viola B. Sharpley
In memory of Dr. Philip D. McMaster
In memory of Mr. A. W. Scheffres

THE ROCKEFELLER UNIVERSITY

BOARD OF TRUSTEES · 1973 — 1974

Ralph E. Ablon

Brooke (Mrs. Vincent) Astor

William O. Baker, *Vice Chairman*

Philip Bard

Charles C. Bassine

Alexander G. Bearn

George F. Bennett

H. B. G. Casimir

Thomas G. Cousins

Eli Whitney Debevoise

J. Richardson Dilworth

Vincent du Vigneaud

Donald R. Griffin

Patrick E. Haggerty

Philip Handler

Marian Sulzberger Heiskell

Christian A. Herter, Jr.

James A. Linen III

Albert L. Nickerson

David Rockefeller, *Chairman*

David Rockefeller, Jr.

Walter N. Rothschild, Jr.

Frederick Seitz, *President*

Robert G. Stone, Jr.

Edwin C. Whitehead

Robley C. Williams, Jr.

C. N. Yang

Photographs by: Heka Davis, William J. Gage, Clarke F. Millette,
David M. Phillips, Steve Robeck, Missak Sarafian