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ALLIES IN THE MARCH OF SCIENCE:  
THE HOPKINS AND THE INSTITUTE

by GEORGE W. CORNER  
Historian of The Rockefeller Institute

Nothing could be more appropriate than a meeting of Johns Hopkins alumni at The Rockefeller Institute, for these two organizations have been bound by close and enduring ties ever since the younger of them, this Institute, was first envisioned. Indeed it can truly be said that The Johns Hopkins University was essential to the very beginnings of The Rockefeller Institute. When the Institute was first thought of, in 1897, The Johns Hopkins University, having been opened in 1876, was twenty-one years old. The Johns Hopkins Hospital had been in operation eight years and had already assembled a very distinguished staff. The Medical School, begun in 1893, was about to graduate its first class. Its senior medical professors were relatively young men. William H. Welch, for example, was 47 years old, Osler was 48, Halsted 45, Mall 35, and the others of similar age. Two of these men in particular were to influence The Rockefeller Institute, Welch directly through many years of devoted service, Osler indirectly through his masterly textbook, The Principles and Practice of Medicine. It is an old story now that in the summer of 1897 John D. Rockefeller's principal adviser, Frederick T. Gates, wishing to educate himself about the current state of American medicine, bought the second edition of Osler's Practice and during his vacation read all its thousand pages with ever-increasing excitement about the crying need of this country for research on disease, and the opportunity this gave Mr. Rockefeller to do something that would benefit the whole nation.

Four years later, in 1901, when Rockefeller decided to go ahead with Gates's project and put his son and Gates in charge, Rockefeller, Jr., called upon two prominent New York physicians, Emmett Holt and Christian Herter, to help him form a board of scientific directors. When he asked these men to nominate others, the first name they suggested was that of Welch, whom they had both known when he was still teaching pathology at Bellevue Hospital in this city. In 1901 Welch was already assuming his role of chief statesman in American medical education and research. He quickly saw the enormous possibilities of Mr. Rockefeller's benefaction. At once elected president of the Board, he put his great wisdom at the service of this institution for thirty-two years. It was Welch who suggested his former pupil, Simon Flexner, as a member of the Board, and when the great bacteriologist, Theobald Smith, declined to be director of the new enterprise it was Welch again who turned to Flexner and said, "Now we hope you will accept the directorship." From the day when Flexner assumed the task, The Rockefeller Institute has always been headed by a Johns Hopkins man. It is a remarkable fact that the three leaders thus far represent the three ranks of university life. Simon Flexner was a faculty member at The Johns Hopkins; his successor, Herbert S. Gasser, was a medical student there; and Detlev Bronk as President represents the administration. Of the seven members of the original Board of Scientific Directors, two, Welch and Flexner, had taught at The Johns Hopkins, and two others, Theobald Smith and Christian Herter, had been postgraduate students there.

Beginning before the new Institute opened its laboratories in 1904, the Board used its income for a few years by making research grants to young men in various medical schools and hospitals. This program was intended to discover and encourage promising young investigators at a time when only a few small centers of medical research existed in this country. It was a pioneering experiment with a method of promoting research that is now a major factor in the scientific life of the nation. It was actively continued until (continued on page two)
1907 and then slowly tapered off. Through this program of grants-in-aid The Rockefeller Institute at once began to repay its debt to The Johns Hopkins University. Quite a number of these novel fellowships went to students and young teachers at The Johns Hopkins Medical School. Several of the recipients in turn afterward joined The Rockefeller Institute and two of them, Eugene Opie and Peyton Rous, are working here today—two of the most distinguished American scientists. The alliance was already at work!

In 1903 the Institute went to the rescue of the University in a strange emergency. Dr. Welch, of all people, was being a naughty boy and not even President Gilman could make him behave himself. Simon Flexner has told this serio-comic story in his biography of Welch. In 1893 Welch had founded, under the auspices of The Johns Hopkins University, the Journal of Experimental Medicine. For seven or eight years he managed it with great success but at heavy cost to his time and energies, for he could never delegate his work to colleagues or secretaries. Editorial tasks distracted Welch from his teaching and ruined his weekends and holidays. He loved to go to a professional baseball game on a summer Saturday afternoon, but he took galley proofs of the Journal to the ball park and read them between the innings. In 1901 he actually tried to give the Journal away to a Harvard group. At last Welch's sense of duty completely broke down under the strain of editorship. After the March number of 1902 he simply quit the job. He sent no more material to the printers and began to stack the incoming manuscripts on closet shelves, and chairs and sofas in his apartment, where they gathered dust along with his unanswered correspondence. Some of the manuscripts stayed there until they became obsolete. President Gilman tried and failed to persuade Welch to complete the half-published sixth volume. At this junction The Rockefeller Institute offered to take over the Journal, to the mingled chagrin and relief of the University. In all probability Welch had pulled the wires himself to get the problem off his own hands in this way, but even so he did nothing more to help clean up the tangle. Flexner and Opie, who were to be the new editors, were un-

able to recover the unpublished manuscripts from their delinquent former teacher and Flexner finally had to go to Welch's home in Baltimore and bring them away in a suitcase. The second half of the interrupted volume was completed at the Institute and published in 1905. Since that time the Journal of Experimental Medicine has appeared with perfect regularity and continues to be one of the world's most respected medical journals.

The founders of The Rockefeller Institute intended from the first to create a hospital in close association with the laboratories, and one of the original Board of Scientific Directors was expected to take charge of it. This was Christian Herter, uncle of the present Secretary of State. Herter was a scientifically-minded physician and biochemist, perhaps the most intellectual member of the Board. Before the hospital could be completed, however, Welch had represented the best nineteenth century traditions of medical instruction. He was a masterly observer and interpreter of disease in individual patients. Barker, on the other hand, came to the professorship of medicine from a career of laboratory research and endeavored to make clinical investigation a major obligation of the professor and his staff. When he set up a biological laboratory in the medical clinic of Johns Hopkins Hospital he put Rufus Cole at its head. Barker, moreover, stimulated by Mall and Welch, was the first spokesman of the "full-time" plan for medical professorships freed from the distractions of private practice.

Chosen to be director of The Rockefeller Institute Hospital, Cole brought with him the new ideal of thoroughgoing scientific study of disease in hospital patients with the aid of every modern laboratory procedure. He saw in the Institute an opportunity to go beyond what was then possible at The Johns Hopkins, by operating the Institute's hospital on the full-time plan. Here he could lead intensive research in an environment free from the ordinary distractions of practice and teaching, making every physician on his staff a scientific investigator, and could train his young men to carry the new methods to other hospitals and medical schools. Any such novel and expensive program required the approval of Mr. Rockefeller and his advisers. Flexner and Gates supported it and in the end the Rockefellerers made generous provision for the hospital as planned by Cole. Thus the inauguration of the first medical clinic in the United States manned by physicians devoting their full time to research, here at The Rockefeller Institute in 1910, was directly stimulated by the advanced thinking of Welch, Mall and Barker. This is the Institute able to introduce the full-time system in its own teaching clinics.

Some people in New York City were

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Since 1956, Dr. Corner has been Historian and Affiliate at The Rockefeller Institute. He has been a regular, but heretofore anonymous contributor to the Quarterly, providing material for the feature "Fifty Years Ago At The Rockefeller Institute."

The address printed here was given on April 3, 1959, at a dinner meeting of the members of the Association of The Johns Hopkins Alumni in the New York-New Jersey-Connecticut area, held at The Rockefeller Institute.

he was stricken with a progressive and ultimately fatal illness and once again The Rockefeller Institute turned to The Johns Hopkins University. The resident physician of The Johns Hopkins Hospital in 1907 was Rufus Cole, a shy, scholarly young man who had done excellent work in medical bacteriology. Cole had served one year under William Osler before the latter left Baltimore for Oxford and then another year under Osler's successor, Llewellys Barker. Just at this time the teaching of internal medicine at Johns Hopkins University was in transition. Osler had represented the best nineteenth century traditions of medical instruction. He was a masterly observer and interpreter of disease in individual patients. Barker, on the other hand, came to the professorship of medicine from a career of laboratory research and endeavored to make clinical investigation a major obligation of the professor and his staff. When he set up a biological laboratory in the medical clinic of Johns Hopkins Hospital he put Rufus Cole at its head. Barker, moreover, stimulated by Mall and Welch, was the first spokesman of the "full-time" plan for medical professorships freed from the distractions of private practice.
highly suspicious of a research hospital next door to experimental laboratories. The anti-vivisection campaign that raged from 1907 to 1909 had given them strange ideas of what goes on in research institutions. When The Rockefeller Institute Hospital was opened, the Board thought it necessary to assure the newspapers that patients would not be used for experiments. Fortunately the public at large had no such fears. Before the opening day seventy persons asked to be admitted as patients and in the course of the next four months more than 2000 applications were received.

Just as Simon Flexner had chosen several of his first laboratory staff from The Johns Hopkins medical alumni, so did Rufus Cole choose two of his first resident staff of the Hospital from that school. The first senior resident was G. Canby Robinson, whose thoughtful autobiography, published in 1957, recounts the happy first years of The Rockefeller Institute Hospital. The charming New Englander, Francis Peabody, although a Harvard graduate, had been on The Johns Hopkins staff as well and I like to think that these two representatives of all that is best in the medical profession contributed something of Osler's tradition of humane medical practice, as well as the scientific spirit of Barker's clinic, to the new institution here on the East River.

When after long and effective service Rufus Cole retired in 1937 from the directorship of The Hospital, his successor was Thomas Rivers, also a Johns Hopkins man; but the tradition was broken in 1956 when Frank Horsfall, alumnus of McGill University, succeeded Rivers.

There was good reason for the preponderance of Hopkins-trained men at The Rockefeller Institute during its first two decades. About half of the young American-trained medical men who came here up to the year 1920 had to be drawn from The Johns Hopkins and Harvard, for there were few graduates of other schools who then sought or qualified for research posts. When the Institute was organized there were in fact only about five universities in the whole country which could properly be designated as centers of medical research, the two I have just named and the Universities of Pennsylvania, Chicago and Michigan. In these, in individual laboratories of a half-dozen other schools, and in a small number of health departments and government laboratories, a few score research men were conducting original investigations in the medical and biological sciences. The reform of medical education, begun about 1907 and speeded up by Abraham Flexner's brilliant report of 1910, led to a rapid increase of research facilities in the medical schools. Somewhat later came an advance also in clinical teaching and research. In 1913 The Johns Hopkins University, aided by The Rockefeller Foundation, put full-time professors in charge of most of its clinics and gave them more adequate research facilities.

(continued on page four)
Within a few years several other medical schools followed suit. As against five or six centers of medical research, there were by 1920 a dozen and by 1925 eighteen or twenty, rivaling the best European universities in their facilities and productiveness. As a result, the young men who passed through The Rockefeller Institute laboratories and hospital by no means went back only to the few places from which they had come. As I have said, one-half of the American-trained recruits of the Institute came from Harvard and Johns Hopkins, but up to 1920 only one-fourth returned to those institutions. The rest spread over the country. By 1925 the Institute was represented, by men it had trained, on the faculties of Columbia, Yale, Johns Hopkins, Harvard, Chicago, Pennsylvania and Vanderbilt. The investment of men that The Johns Hopkins University had made in The Rockefeller Institute was paying dividends to the whole nation.

It is time I gave you a few figures to back this claim. I am making, that The Johns Hopkins University and The Rockefeller Institute have been close allies in the march of science. Let us begin at the top of the list with the executives. I have already mentioned three heads of the Institute and two directors of its hospital who got all or some part of their experience in Baltimore before coming here. Now for the Board members: until 1953 the scientific policies of The Rockefeller Institute were controlled by a Board of Scientific Directors made up entirely of physicians and scientists. In the half-century from the foundation to 1953 the members of the Board numbered in all twenty-two men. Of that number, fourteen had studied, taught or been President at The Johns Hopkins University. In 1953 this group was merged and transformed into a Board of Trustees made up of both scientists and laymen. There are at present fifteen trustees, of whom five have been connected in one capacity or another with The Johns Hopkins University.

Next the general list of scientific workers at this Institute: Here also my tabulation stops at 1953 because Dr. Bronk’s direction is the last year of the history of the Institute I am now writing. First the full Members (now called Professors since the Institute has become a graduate university), heads of research laboratories in the various special fields: from 1903 to 1953, fifty-four men and one woman were appointed to this top rank of the Institute’s staff. Fifteen of the fifty-five were Johns Hopkins people by my criterion—that is to say they were enrolled for a year or more in the University’s student body or faculty, long enough to allow them to boast about it the rest of their lives. These I shall name, for they make a distinguished group: R. M. Archibald, Detlev W. Bronk, Wade Hampton Brown, Rufus I. Cole, Lyman C. Craig, Simon Flexner, Herbert S. Gasser, Henry G. Kunkel, Maclyn McCarty, James B. Murphy, Eugene L. Opie, Thomas M. Rivers, Peyton Rous, Florence R. Sabin, and Leslie T. Webster and just for good measure let’s mention two more, Frank Brink, Jr., and H. Keffer Hartline, who did not come until 1953. Even on behalf of my Alma Mater, however, I cannot claim Leonor Michaelis, a man of genius, to whom the University once gave a temporary home and a lectureship when Nazi tyranny had driven him from his native land.

Including full Members with other ranks, in the half-century from 1904 to 1953, according to my figures one hundred men and women trained wholly or in part at The Johns Hopkins came to the staff of this Institute to do scientific work. That is something like twelve per cent of the whole staff during the period in question, and even at the present time, when there are so many more centers of research to send us workers than there were a few decades ago, I estimate that about eight percent of those who are doing research in these buildings—one person in every twelve—has at one time or another studied, taught, been a hospital resident or an administrator at The Johns Hopkins University.

Let us not be too cocky about these figures. Though I have not included any ringers, many of those I have counted are also tinged with the colors of other institutions. If, for example, the University of Michigan, Pennsylvania or Swarthmore alumni associations ever meet here to listen to a speech like this, we shall have to let them have Dr. Bronk as their man just for that evening. After all, there are a few Harvard, Yale, Columbia and Cornell men (continued on page eight)
unless we as adults and as a nation—not only a few of us but everyone—have an appreciation for the beauty of learning, for the beauty of inquiry, for the beauty of the intellect, it is going to be very hard to give our children any true appreciation of science except for the few who happen to be born or are accidentally motivated to be interested in science.”

Mr. Sevareid asked: “Not all our children are going to be scientists...How are they to understand this new world, this new environment? How do we teach them?”

Dr. Bronk’s response aroused approving applause from the audience. “I would be so bold as to make three suggestions,” he said: “One is that we do as little as possible to suppress their natural curiosity; second, occasionally to encourage someone who is capable of inspiring them with the satisfactions of learning to do so; and thirdly, to teach them as little as possible and give them as much opportunity to learn as may be.”

Four subsequent programs ranged over broad topics of significance that comprise a challenge to the nation. On March 1st Dr. Robert M. Hutchins, President of the Fund for the Republic; Professor J. Kenneth Galbraith, Professor of Economics, Harvard University; Dean McGeorge Bundy, Faculty of Arts and Sciences, Harvard University; and Chancellor Edward H. Litchfield, University of Pittsburgh, discussed the topic: “Is America Anti-Intellectual?”

On March 22nd, the topic was “Can Democracy Meet the Space Age Challenge?” Participants were Senator John F. Kennedy of Massachusetts, Arthur Larson, former Presidential adviser and Director of the Rule of Law Center of Duke University, Dr. Clinton Rossiter, Professor of American Institutions at Cornell University, and Dr. Merle Fainsod, Professor of Government at Harvard University.

The final two programs, on March 29 and April 5, were devoted to an appraisal of journalism in this country today. They were produced with the cooperation of Sigma Delta Chi, a professional journalism fraternity to honor its fiftieth anniversary. The first program “Is American Journalism Meeting Its Responsibilities? was participated in by Lady Barbara Ward Jackson, former foreign affairs editor of The Economist of London; John Fischer, Editor-in-Chief of Harper’s Magazine; Eugene C. Pulliam, honorary President of Sigma Delta Chi, and publisher of newspapers in Indiana and Arizona; J. Russell Wiggins, Vice President and Executive Editor of The Washington Post and Times Herald, and Sig Mickelson, Vice President, CBS, Inc., and General Manager of CBS News. The panel for the final program on “Is The American Public Getting The Information It Needs?” included James C. Hagerty, Presidential News Secretary, James Reston, Chief of the Washington Bureau of The New York Times; Arthur M. Schlesinger, Jr., Professor of History at Harvard University; Robert D. Sweeney, Executive Vice President and General Manager of WDSU Broadcasting Corporation, New Orleans, and Chairman of the Freedom of Information Committee of the National Association of Broadcasters, and the Honorable Charles A. Sprague, former Governor of Oregon and publisher of the Salem, Oregon Statesman.

SOPHIE D. FRICKE INTERNATIONAL FELLOWSHIPS AT THE INSTITUTE

A gift of approximately $1,000,000 which was bequeathed by the estate of the late Sophie D. Fricke has made it possible to establish four senior fellowships at the Institute for research by foreign scientists. Miss Fricke, who died on March 1, 1958, lived most of her life in New York where she was confidential secretary to many prominent business executives. Through wise investment of her personal savings, she created the fortune which she left for the furtherance of human welfare through the support of science.

The Trustees of the Institute have authorized use of the income from the Fricke fund for the triple purposes of fostering international understanding, training scientists of exceptional promise, and supporting significant research.

The Fellows will be appointed by the Royal Society of London, the French Academy of Sciences, the Royal Danish Academy of Sciences and Letters and the Swedish Royal Academy of Sciences. Each Fellow from England will be known as the Sophie Fricke Royal Society Research Fellow in The Rockefeller Institute, with similar designations for those appointed by the other foreign academies. They will receive an annual stipend of $10,000 with an additional $1,000 for travel in this country.

“The objective of these fellowships,” said Dr. Bronk in announcing them, “is to foster closer relations between American scientists and their colleagues from abroad. It is our intent that the Fellows be young men and women of exceptional promise who are likely to be leaders in science in their respective countries and will, therefore, ultimately be appointed to distinguished posts in their native lands. Having spent one or two years in the United States under exceptionally favorable circumstances before assuming posts of responsibility at home, these men and women will be in an unusually favorable position to develop the associations with American scientists begun while at The Rockefeller Institute.”

The first Sophie Fricke Fellows appointed by the foreign academies will begin their work at the Institute this coming autumn. All the facilities of the Institute and the advice and guidance of the Institute’s distinguished faculty will be available to the Fellows; they will be free to work on problems of their own choosing or they may collaborate with one or more members of the Institute faculty.

ANOTHER ACADEMICIAN

Professor Frank Brink, Jr., Dean of Graduate Studies, was elected to membership in the National Academy of Sciences at the 96th Annual Meeting of the Academy in Washington, this Spring. His election brings to forty-seven the number of members of the faculty, visiting professors and trustees who are academicians.

Dr. Brink was one of the first to take his doctorate at the Johnson Foundation where President Bronk was director. He was associated with Cornell Medical College, the Johnson Foundation, and The Johns Hopkins University before coming to the Institute in 1954.
The Trustees

GEORGE MURNANE, SR.

George Murnane, Sr., investment banker with the firm of Lazard Frères, has been a Trustee of the Institute since 1928. Despite his modest estimate of his own contributions, his fellow-Trustees and President Bronk have looked to him for wisdom and guidance in planning the many new developments at the Institute.

Mr. Murnane became a Trustee through his association with the late Jerome Greene, an older and respected friend and business partner. Mr. Greene, a close associate of John D. Rockefeller, was a remarkable figure in the early period of the Institute’s history—its first business manager for two short but decisive years, and Trustee from 1912 to 1932 when he resigned to become Woodrow Wilson Professor of International Politics at the University of Wales. Mr. Murnane, just past 40, accepted the post offered him with his characteristic combination of humility, enthusiasm and devotion. In recalling the years since, under direction of Simon Flexner, then Herbert Gasser, and now President Bronk, Mr. Murnane notes that he has never encountered anything small about the affairs of the Institute, a fact which he regards as a tribute to its leadership.

Recently, Mr. Murnane has had a significant role to play in the new plans of the Institute, for it was through his offices as executor of the Caspary estate that funds for the construction of three of the new buildings, including Caspary Hall, were made possible. Alfred H. Caspary, a little-known financier who died in 1955, left virtually his entire estate of $16 million to be used for charitable purposes generally. He named his intimate friend, George Murnane, as sole executor.

Faced with this responsibility, Mr. Murnane resolved to dispose of the Caspary fortune directly, rather than endow a foundation to administer small grants from the earnings of the estate. Further, he reasoned that of all possible fields of endeavor, advancement of medicine and biology was likely to be most tangibly and assuredly in the common good. Finally, he chose to make large gifts from the estate to soundly established institutions that he judged capable of using relatively large sums wisely.

These principles led almost inevitably to The Rockefeller Institute and so it was that some $3 million were provided from the Caspary estate for three of the new buildings on the campus: Caspary Hall, the President’s house, and the first unit of the graduate student residence. This gift was the first major contribution to the Institute from outside the Rockefeller family.

Together with substantial gifts from Mr. John D. Rockefeller, Jr., Mr. David Rockefeller, and Mr. Winthrop Rockefeller, the gift from the Caspary estate has made possible the new face of the Institute’s campus. Caspary Hall’s dome-shaped auditorium has given faculty and students for the first time an adequate lecture hall specifically designed for the purpose. A number of seminar rooms for graduate education, and associated offices, are also provided in Caspary Hall. The graduate student residence hall, just completed, enables students for the first time to live graciously and well in the midst of the city.

Two other institutions received large grants from the Caspary estate under Mr. Murnane’s executorship. The Hospital for Special Surgery received funds for constructing a Laboratory of Orthopedics that will provide a unique center specializing in research on orthopedic problems. The Animal Medical Center (until recently known as the Speyer Hospital for Animals) was enabled to begin construction of a building not far from the Institute in which to care for animal diseases and especially to carry on investigations into animal diseases in collaboration with human medicine.

Mr. Murnane was born in Brooklyn in 1887, and except for attending Lehigh University and working in Buffalo for a short time thereafter he has been a New Yorker all of his life. With a vision of leveling mountains and bridging chasms, George Murnane obtained a degree in Civil Engineering. But he found squinting through a transit, and plodding up and down hillside dragging a surveyor’s chain, not to be the kind of adventure he had hoped for. Though he has remained grateful for the training in rigorous and logical thought that engineering and mathematics at Lehigh offered, Mr. Murnane found in the world of banking and commerce the kind of adventure he enjoyed most.

Shortly after World War I, with little or no training in banking but much enthusiasm, Mr. Murnane in 1919 joined the New York Trust Company as Vice President and was placed in charge of its foreign business. At a time when few American banking institutions had become interested in European investments, the New York Trust Company began to develop a substantial business abroad. Mr. Murnane recalls this period of assisting postwar reconstruction through private financing as most exciting and challenging. In 1928 he joined the firm of Lee Higginson and Company as a partner, and his association with Jerome Greene of the same firm led him to membership on the Institute’s Board of Trustees. In 1935 Mr. Murnane formed a partnership with M. Jean Monnet, in Monnet, Murnane and Co., and since World War II he has been a partner with the firm of Lazard Frères & Co. Mr. Murnane’s son, George, Jr., is now like his father a partner of the firm.

Mr. Murnane denies that any interest could attach to the details of his personal life, but his voice quickens and he reaches for his collection of photographs at the mention of dogs. One would not have to be a dog fancier to admire Duke, his National Champion Labrador Retriever whose performance has been photographed by Time magazine. The Murnanes have nine dogs in their kennels now, all Labradors or Golden Retrievers and all champions or champions-in-the-making. He keeps his dogs at his estate on Long Island and they are worked with daily by his handler and Mrs.
Murnane. He is seldom allowed near them because he would spoil them—"I pet them," he explains.

When he considered his vision of the Institute's future, Mr. Murnane mused that it provides a combination of superb facilities and the best of men—an environment that is a magnet which has drawn and will draw the great. Now, into this environment have been brought a few highly selected students for an experiment in highly advanced education. In speaking of its pioneering role as a graduate university of science, Mr. Murnane said, "The Institute can become in the field of graduate education, as it was originally in research, an institution whose example will be followed throughout the world." And he added: "I have treasured my association with the Institute for over thirty years, but it has never been more exciting than now."

NEW TREASURERS

DR. LINDSLEY F. KIMBALL, Trustee of The Rockefeller Institute since 1947 and Vice President of The Rockefeller Foundation for many years, was elected Treasurer of the Institute, effective on April 1, 1959. At the same time, Mr. William E. Dietz was appointed Assistant Treasurer. Since 1938 Mr. Edward Robinson has been Treasurer, and Mr. Robert Letort has been Assistant Treasurer since 1954. They both have similar responsibilities for The Rockefeller Foundation and the General Education Board.

As the scale and complexity of the Institute's fiscal operations have increased, it has become apparent that this growing burden could not fairly remain with Mr. Robinson and Mr. Letort, and it is a tribute to their devotion that they and their staff have been able to serve the Institute so well during these demanding years.

Mr. Dietz will be at the Institute full time, and he will carry the day to day burden of the Treasurer's office. He was graduated from Dartmouth with a B.S. in mathematics, but budget and finance have been his professional interests throughout his life. He has occupied senior posts in the accounting department of the New York Telephone Company and USO, and since 1943 he has served as Controller and as Assistant Treasurer of the National Board of Young Men's Christian Association.

ATOMS FOR PEACE AWARD

Presentation of the second Atoms for Peace Award, consisting of a gold medal and $75,000, was made to Professor George Charles de Hevesy at The Rockefeller Institute on January 29, 1959. Professor de Hevesy, who received the Nobel Prize in Chemistry in 1943, is known and honored internationally for his work which resulted in the use of radioactive as well as stable isotopes as tracers in chemical and biological problems.

The Atoms for Peace Award, established by Ford Motor Company as a memorial to Henry Ford and Edsel Ford, was presented by President Bronk, Chairman of the Board of Trustees responsible for selecting the recipients. Dr. Glenn T. Seaborg, Chancellor of the University of California, reviewed de Hevesy's scientific accomplishments. Recalling that his achievement was born of his failure to separate Radium D from lead, Dr. Seaborg said: "At times... ingenuity may turn total failure into an achievement of inestimable consequences. We are gathered here today to honor a man whose major work is a classical example of this theme." The Honorable Dag Hammarskjold, Secretary-General of the United Nations, in his address on the occasion said: "It is, indeed, the duty of society to honor such men in words, but it is also its duty to honor them in deeds, by treating the problems of modern man in a way worthy of the advance of knowledge, to which they have made such decisive contributions."

ACADEMIC PRESS FELLOW

A fellowship for the year 1959-60, established at the Institute by the Academic Press, has been awarded to Mr. Lewis J. Greene, member of the first class of Graduate Fellows at the Institute. Mr. Greene received his B.S. degree from Amherst College in 1955. He planned to prepare for biochemical research in medical school, but he came to the Institute in 1955 when he was strongly recommended by the president and faculty of Amherst. Mr. Greene's thesis research concerns the study of amino acid sequences in proteins, but he has taken a few months away from this research to carry on an investigation to determine the complete enzymatic composition of the zymogen granules of the acinar cells of the pancreas.

GRADUATE FELLOWS GIVE SUMMER COURSE

TWENTY-SEVEN graduating high school seniors in the New York Metropolitan area will study at the Institute this summer in courses to be taught by the Institute's graduate fellows. A generous grant of $35,000 from the Carnegie Corporation will provide laboratory equipment and facilities as well as a modest stipend for students for two successive summers. In announcing the summer program, Dr. Bronk said: "Our purpose has been threefold. Our first objective has been to give selected graduate students the rich satisfaction of teaching that comes from full responsibility for this rewarding activity; we thus hope to attract many of our graduate students to the teaching profession at a time when teaching is often less respected than research. Secondly, we hope to inspire promising high school graduates with the great adventure of research by close association with young scientists who are in the first flush of their beginning research careers. Finally, by providing this intensive course of instruction, the students, when they enter college, will have gained a year so that they may go on to more advanced college courses."

This year's students, nominated by the principals of their high schools, have already been accepted. They were selected as having outstanding records with every indication of promising careers in science. Courses will be given five days a week from July 6 through August 14. A wide variety of topics in biology will be presented, including laboratory work in the fields of ecology and adaptation, plant physiology, neurophysiology, cell physiology and biochemistry, microbiology and genetics and evolution.

The courses will be taught by Robert DeVoe, Timothy Loeb, Bruce Voeller, John Cebra, David Eaker, Johns Hopkins and William Talbot. Richard Cellarius assisted them in organizing the program.
working here too. Indeed I suppose a hundred American, European, and Asian universities are represented on our staff; but even with these reservations this audience will surely agree that I have made a case for my claim that The Johns Hopkins University has heavily influenced and continues to influence the intellectual life of The Rockefeller Institute.

NOTABLE HOPKINS ALUMNI

I wish there were time to speak at length about some of the eminent Hopkins-trained scientists and physicians who have distinguished themselves here. A few paragraphs must suffice. Simon Flexner I have already mentioned. Director of the Institute from 1903 to 1935, he served it with such skill and wisdom, making himself leader not only of the research staff but also of the Board of Scientific Directors, that for thirty-two years his personality largely determined the character of the Institute.

Eugene Opie came here in 1904 as a young man, but already an experienced pathologist and teacher. Six years later he was called away to Washington University, St. Louis. After a distinguished career there, and later at the University of Pennsylvania and Cornell Medical College, he returned to the Institute ostensibly for a post-retirement position, and here he goes on working with youthful zest. He is by several years our oldest researcher, but it would be inappropriate to designate him by the terms so often applied to our eminent elders. Patriarch? No, for he has the slim figure and bright eyes of a youth, and wears no beard. Solon, or Nestor? No, for he makes no show of his wisdom and experience. Elder statesman? Yes, in a quiet way; but he is best characterized as just one of us, a professional scientist going about his daily work, honored for his skill and brains, not merely for his years.

Peyton Rous, who joined the Institute in 1909, is young enough, if my calculations are correct, to have been a student under Opie at The Johns Hopkins Medical School. At any rate, he told me only the other day that when he came here, "a mere beginner", to use his own words, he looked upon Eugene Opie as a respected older scientist, and I believe he still does. But Peyton Rous too must accept the affectionate admiration of us younger fellows. During his first few months at the Institute he made one of the most significant discoveries ever achieved here, the finding and thorough study of the first malignant tumor known to be transmitted by a virus. Cancer research has never been the same since the shake-up he gave it nearly fifty years ago! Rous's work on blood preservation, done during World War I, started the whole vast system of blood banks to which we all donate when the Red Cross calls upon us. If there were time, I could tell you about his other important researches in later years. He, too, works here daily in his fiftieth year of continuous service to the Institute, across the corridor from Eugene Opie.

Rufus Cole, who directed the hospital during its formative years, quiet scholar and gentle leader of a brilliant staff, an intellectual among the doctors, retired long ago and lives in the country near Mt. Kisco. When Mrs. Corner and I visited him there a year or two ago we found him in his book-lined study, writing a scholarly work on a topic far removed from medicine. What better proof of devotion to learning could Alma Mater ask of her son in his eighty-seventh year?

A FATHER AND A SON

James B. Murphy came in 1910 and devoted himself for four decades to cancer research, in which he made valuable contributions. His career coincided with a changing attitude of the public and the medical profession toward malignant disease. Fear and hopelessness were giving way to optimism based on the advance of scientific research and surgical technique. At such a time Murphy's long experience, personal charm and gift for executive leadership made him extremely useful in national scientific affairs. He took a notable part in societies formed to educate the public and the medical profession, and helped to organize cancer research as a board member of Memorial Hospital in this city, the Jackson Laboratories at Bar Harbor and the Roswell Park Memorial Institute at Buffalo. The year after his death in 1950 his son James S. Murphy joined The Rockefeller Institute as an investigator of virus diseases. This I believe is the only instance of a father and son who were both Johns Hopkins alumni and both on the staff of The Rockefeller Institute as well.

Louise Pearce, Johns Hopkins M.D. of 1912, was the heroine of one of the most dramatic episodes in the Institute's history. About 1914 a team of four investigators went to work here, trying to find a chemical drug that would cure African sleeping sickness, then a terrible scourge, especially in the Belgian Congo. Their efforts were successful, for they soon found a compound of arsenic that was effective in experiments on animals. Doctor Pearce, best equipped of the four to conduct clinical tests, volunteered to take the drug to Africa for trial in the field. On this assignment, none too easy for a woman physician and not without its dangers, she was fully successful. At Leopoldville in May 1920 she saw for the first time human beings suffering with the dreadful disease which she and her colleagues had been fighting from a distance. Under her care and that of the Belgian physicians with whom she worked, early cases were promptly cured and even dying patients were rescued. For her services Dr. Pearce received the Order of the Crown of Belgium, and many years later the King Leopold II Prize of $10,000 and the insignia of the Royal Order of the Lion, a most appropriate decoration for that lion-hearted scientist. In later years Dr. Pearce took part in other important research, which I have not time to narrate, and also served the cause of medical education as President of the Woman's Medical College of Philadelphia.

Tom Rivers, my one-time classmate, came from the Children's Clinic at Johns Hopkins Hospital. Assigned to study virus diseases at a time when almost nothing was known of the nature and natural history of the viruses, he taught himself how to work in that field and won a place among the foremost virus workers of our country. He too proved his mettle in the face of mortal danger. When parrot fever (psittacosis) appeared in New York in 1930 the City's Board of Health Laboratory undertook to study it. Four of the six workers assigned to the problem contracted psittacosis with its dangerous inflammation of the lungs. Their leader threw up his hands and sent his stock of virus to The Rockefeller Institute. Tom Rivers and two assistants, George Berry and Francis Schwentker, all three Johns Hopkins men, volunteered to take over the study. For two years their laboratory was the only one in the United States.
States that ventured to deal with this exceedingly infectious disease. In spite of all precautions, both Berry and Schwentker contracted it, but fortunately survived, Berry to become in later years dean of Harvard Medical School, and Schwentker the now lamented professor of pediatrics at The Johns Hopkins University. After a long career devoted to virus diseases and to the direction of The Rockefeller Institute Hospital Rivers is now, in so-called retirement, directing the research program of the National Foundation, formerly known to us all as the Polio Foundation.

Herbert Gasser, Johns Hopkins M.D. of 1915, came to the Institute relatively late in his career, to be its director in Flexner’s place. For his brilliant work on the physiology of the nervous system, begun at St. Louis, Gasser in 1944 shared the Nobel Prize with another Johns Hopkins alumnus, Joseph Erlanger of Washington University. Many of The Rockefeller Institute staff here tonight served during Gasser’s directorship and will testify to the intellectual vigor and broad scientific knowledge which he brought to the headship of this institution.

A GREAT HOPKINS WOMAN

Florence Sabin also came to the Institute relatively late in her career, having achieved eminence as a teacher and investigator of microscopic anatomy at The Johns Hopkins. Here for thirteen years, from 1925 to 1938, she studied intricate problems in the pathology of tuberculosis and trained a half-dozen young men who went on to professorships and one to a deanship in medical schools. Only after she left here, however, did Dr. Sabin reach the pinnacle of her career. Retiring to her native state, Colorado, she was soon caught up in a movement to reform the inadequate public health administration of that state. Indeed she herself started the movement, and promoted it by a vigorous political campaign, travelling by car through all that mountainous region to address the voters. When the state’s public health statutes were finally redrawn, the Mayor of Denver found no one qualified to be Health Officer of that city and insisted that Dr. Sabin herself should take the post. At the age of seventy-six and without previous administrative experience she thus became chief health officer of a city of 300,000 people, successfully carrying on her duties to the age of eighty. Amazed by such courage and versatility and grateful for her services, the state of Colorado has declared her one of its foremost citizens, to be commemorated by a statue in the Capitol at Washington, and there, since the dedication ceremony on February 26 of this year, you may see her likeness in bronze, by Joy Buba of New York, enthroned on a laboratory stool such as she used at The Rockefeller Institute, with her microscope at her side, her arm on a volume of the health laws of Colorado and her inspired countenance lifted toward a future in which science will go on winning its benefits for her people.

[Editor’s Note: For those who are not frequent visitors to the Capitol, a photograph of the statue is shown on page three.]

These stalwart sons and daughters of our University have done a work here that will never be forgotten, and have been followed by dozens of younger fellow-alumni

(continued on page ten)
who treasure the example they set, and strive to emulate them.

But you will ask, how has The Rockefeller Institute repaid the University’s gift of so much scientific talent and scholarship? Chiefly, of course, in the only way by which children can repay the generosity of a parent—by passing it on to others. I have already said that numerous young men trained in this Institute have taken research and teaching posts elsewhere, many of them becoming professors or directors of research. This spread of a tradition of scientific medicine and biology, so largely inherited from The Johns Hopkins, goes on to this day and will go on even more rapidly now that The Rockefeller Institute has become a university faculty of science, graduating this year its first group of young investigators and scholars. The Institute has moreover repaid part of its debt directly by sending men and women to The Johns Hopkins. My records show that up to 1953 thirty-three workers, in all, went from here to join the Baltimore faculties and the Hospital. The Institute helped to train a dean for The Johns Hopkins Medical School, Alan Chesney, who was here from 1913 to 1917 on the hospital staff, and again in 1922 in the laboratory of Wade Brown and Louise Pearce. The Institute has supplied moreover five full professors to the Medical School and the School of Hygiene: Frederik Bang, Carroll G. Bull, Roger Herriott, Perrin Long, and Francis Schwentker.

THE INSTITUTE REPAYS

At the head of departments of parasitology, bacteriology, chemistry, preventive medicine and pediatrics these men, and along with them more than two dozen in other ranks, have added to the intellectual resources of The Johns Hopkins University, by knowledge and experience gained here. Their numbers will henceforth surely increase. As the faculty of this Institute sends out the young men who will every year receive their diplomas from Dr. Bronk’s hands on this very platform, I hope that Dr. Eisenhower will call some of the best of them to The Johns Hopkins University.

In 1914, at a dinner honoring Simon Flexner’s first decade of service to the Institute, in the presence of John D. Rockefeller, Jr., and William H. Welch, Frederick T. Gates expressed in fervent words his satisfaction with the institution he had been the first to dream of, and his hopes for its future. What he said then of The Rockefeller Institute is equally true of The Johns Hopkins University, its predecessor and its ally in the march of science:

“Here is an institution,” said Mr. Gates, “whose value touches the life of every man that lives...Who has not felt the throbbing of desire to be useful to the whole wide world? Here at least is a work for all humanity, which fully satisfies and fills that glorious aspiration...Your vocation goes to the foundations of life itself...Whatever you learn about nature and her forces, and prove and incorporate into your science, will be carried forward, though all else be forgotten.

“You work not for today, but forever.”

UNIVERSITY TEAS

THE MODERN UNIVERSITY in an urban location faces two difficulties in maintaining its traditional character as a community of scholars—the size of the faculty and student body and the dispersal of their residences. The limitation on the extent of personal association among faculty and students imposed by great size, The Rockefeller Institute has avoided. But the dispersal of suburban living which make difficult social relationships we have not so easily avoided. The new Faculty and Students Club, announced elsewhere in this issue, will help in this respect. Still more has been done by Mrs. Bronk, who has arranged a series of informal Wednesdays afternoon teas this Spring for wives of the faculty and students. The ladies gather in the early afternoon in the recreation room of Abby Aldrich Rockefeller Hall. They play bridge or simply engage in conversation, perhaps over their needlework. Tea is served at 4:00 p.m., and the group disperse in time to join their husbands at the end of their working day.

These informal affairs have given new opportunities for friendly associations on other grounds than the accident of juxtaposition of laboratories or offices or occasional encounters at more formal social gatherings.

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COMPUTER PROCESSING OF MEDICAL AND BIOLOGICAL DATA DISCUSSED

The use of computers for processing diagnostic and medical data was discussed at a conference held by the Medical Electronics Center at the Institute on January 14, 1959. About 45 participants attended the wide-ranging and informal discussions, which were introduced by Dr. V. K. Zworykin, head of the Center, and were chaired by Mr. Carl Berkley.

Current projects and problems in using computers to assist diagnosis in such medical specialties as hematology were first presented. This work is being conducted at the Institute with the collaboration of local hematologists and computer facilities. There followed examples of the use of machines for obtaining and processing of medical data. Some studies have already been made or are planned, such as computer analysis of complex intraluminal pressure records, multiple correlations among several physiological variables, and partial analysis of electroencephalograms.

The usefulness of computers for analysis of mathematical models of biological systems has now been rather widely demonstrated. At the conference examples were shown of computer simulation of the kinetics of redistribution of an intravenous anesthetic in the body under varying degrees of stimulation. This work was done by Dr. Henry Price at the University of Pennsylvania and was reported by Miss Maxine L. Rockoff of the University's Computer Center. Another example was a study of how the shape of the red blood cell affects predicted values for its gas uptake. In both cases mathematical models involving second-order non-linear partial differential equations not amenable to analytical solution were solved on a digital computer. Dr. R. Stacy of the University of Ohio reported use of analog computers to simulate peripheral circulation systems and to match the pulse wave recordings with the computer waveshapes obtained by arbitrarily adjusting the parameters.

The use of machines for accumulating and analyzing vast quantities of medical data was discussed by Dr. Halbert L. Dunn, Chief, National Office of Vital Statistics and Dr. George R. Meneely of Vanderbilt University. From studies of masses of clinical data, vital statistics, etc., it was proposed that unsuspected useful correlations might be discovered.

At the close of the conference the participants unanimously formalized their conviction that much practical work is now under way and ready to be undertaken. Abstracts of the conference papers have been prepared for distribution.

FACULTY ACTIVITIES

Academic Honors

DETLEV W. BRONK
LL.D., University of California
TH. DOBZHANSKY
Sc.D., University of Munster, Germany
Sc.D., University of Montreal

Lectures, Conferences and Symposia

CARL BERKLEY
Participant, Second Annual Conceptual Symposium, Atomedic Research Center, Montgomery, Alabama.

DETLEV W. BRONK
Anniversary Discourse, New York Academy of Medicine.
Dedication Address, Biophysics Laboratory, Stanford University.
Address, Winter General Meeting, American Institute of Electrical Engineers.
Address, 75th Anniversary, Graduate School of Arts and Sciences, University of Pennsylvania.
Address, 91st Charter Day Anniversary, University of California at La Jolla.

VERNON B. BROOKS
Lecture, the New York Academy of Sciences.

MERRILL W. CHASE
Lecture, the New York Roentgen Society.

TH. DOBZHANSKY
Heaps Ely Silliman Memorial Lectures, Yale University.
Lecture, Tenth International Congress of Genetics, Montreal.

RENÉ J. DUBOS
Lecture, Franklin Institute, Philadelphia.
St. Christopher's Lecture, St. Christopher's Hospital for Children, Philadelphia.
Squibb Centennial Lecture, delivered at Bowman-Gray Medical School, Winston-Salem; Vanderbilt University, Nashville; University of Mississippi, Jackson; University of Georgia, Augusta; University of Florida, Gainesville; University of Miami Medical School, Coral Gables.
Kennebco Lectures, University of Arizona, Tucson.

CHARLES D. DUKES

KARL MARAMOROSCH
Participant, New York Academy of Sciences Conference on Genetics of Streptomyces and Other Antibiotic-Producing Microorganisms.
Participant, Merck Symposium on Biological Control of Insects.
Banquet Address, Annual Meeting, Potomac Division, American Phytopathological Society, Beltsville.

DAN H. MOORE
Lecture, Columbia-Presbyterian Medical Society.
Lecture, New York Society of Electron Microscopists.
FRANCIS O. HOLMES  
Official Delegate from the Rockefeller Institute, 59th Annual  
Convention of the National Society of the Sigma Xi.  
Consultant, University of Puerto Rico, Agricultural Experiment  
Station, Rio Piedras.

FRANK L. HORSFALL, JR.  
Member, Commission on Health Services, New York City.

PEYTON ROUS  
Landsteiner Award, American Association of Blood Banks.

RICHARD E. SHOPE  
Honorary Member, Central New Jersey Veterinary Medical As-

Sociation.

Bertner Foundation Award, The University of Texas M. D.  
Anderson Hospital and Tumor Institute, Houston.

PAUL A. WEISS  
Chairman, Editorial Board, Developmental Biology.

V. K. ZWORYKIN  
Medaille Gustave Trasenster Award, University of Liége, Bel-

gium.

Miniaturization Award, Certificate of Excellence, Miniature  
Precision Bearings, Inc., Keene, New Hampshire.

Society Elections

MERRILL W. CHASE  
National Councilor, Society of American Bacteriologists.

JOHN W. FARQUHAR  
Member, Harvey Society.

MARIA A. RUDZINSKA  
Member, Harvey Society.

INSTITUTE MENTION

New Appointments to the Faculty

DR. REINHARD BROSSMER of the Institut für Chemie, Max-  
Planck-Institut für Medizinische Forschung, has been ap-

pointed a Research Associate, and will work in Dr. Goebel’s  
laboratory.

DR. LUIZ F. M. COSTA, Associate Professor of Physiology,  
Faculty of Medicine, University of Bahia, has been ap-

pointed a Guest Investigator in Dr. Csapo’s laboratory, effec-


DR. ANGELO FASOLI, Assistant Professor of Medicine at Istitu-

to di Clinica Medica Generale e di Terapia Medica, Della  
Università di Milano, worked as a Guest Investigator in  
Dr. Dole’s laboratory for two months, beginning January 26,  
1959.

DR. E. MYLES GLENN, a Research Investigator in the De-

partment of Endocrinology of the Upjohn Company at Kalama-

zzo, was appointed Guest Investigator on March 15, 1959,  
to work with Dr. Csapo.
Dr. Robert C. King, an Associate Professor of Biology at Northwestern University, has been appointed Guest Investigator and Fellow of The Rockefeller Institute, effective March 1, 1959; he will work with Dr. Porter.

Dr. Seymour J. Klebanoff, formerly a Guest Investigator in Dr. Archibald's laboratory, has been appointed a Research Associate of the Institute.

Dr. Hirosy A. Kuriyama, a Member of the Department of Physiology, Kagoshima University, was appointed a Guest Investigator in Dr. Csapo's laboratory, beginning March 1, 1959.

Dr. Alexander Mauro, formerly an Assistant Professor in the Department of Physiology, School of Medicine, Yale University, has been appointed an Assistant Professor in the laboratory of Drs. Bronk and Brink.

Dr. Alison A. Newton, a member of the Pathology Department at Cambridge University, has been appointed a Research Associate in Dr. Horsfall's laboratory.

Dr. Toshio Sakai, who has been working with Dr. Csapo in his laboratory as a Guest Investigator, has been appointed a Research Associate of the Institute.

Faculty Terminations

Dr. Aida Traverso Cori, who worked as a Guest Investigator in Dr. Perlmann's laboratory, left the Institute on January 31, 1959, to return to the University of Chile.

Dr. Elsimar M. Coutinho, a Guest Investigator in Dr. Csapo's laboratory, left the Institute on January 31, 1959, to return to the University of Bahia where he is Assistant Professor of Physiology.

Dr. Howard G. Davies, who was Assistant Professor in Dr. Porter's laboratory, returned to the Biophysics Research Unit of King's College, London, on March 31, 1959.

Dr. Friedrich P. Diecke, a Guest Investigator in Drs. Lloyd's and Wilson's laboratory, returned to the University of Tennessee where he is a member of the Department of Physiology, March 26, 1959.

Dr. José Luis Garcia-Bilbao, a Research Associate in Dr. Lorente's laboratory, left the Institute on March 15, 1959, to return to Spain.

Dr. Thomas D. C. Grace, formerly a Research Associate in Dr. Braun's laboratory, left the Institute on January 23, 1959, to return to Australia where he is a Research Officer in the Division of Entomology, Commonwealth Scientific and Industrial Research Organization at Canberra.

Dr. Darrel H. Spackman, who was a Research Associate in the laboratory of Drs. Moore and Stein, left the Institute on March 31, 1959, and will be a Senior Biochemist in the Spinco Division of Beckman Instruments, Inc., in Palo Alto.

Visiting Professors in Residence

Dr. Francis H. C. Crick, Medical Research Council Unit for Molecular Biology, Cavendish Laboratory, Cambridge, January 21-28, 1959.

Dr. Alexander von Muralt, Professor of Physiology, University of Bern, February 16-March 13, 1959.


Guest Speakers

Melvin V. Simpson, Associate Professor of Biochemistry, Yale University, February 3, 1959.


Paul M. Doty, Department of Chemistry, Harvard University, March 10, 1959.

Reinhold Neibuhr, Union Theological Seminary, March 17, 1959.

Guest Seminar in Medicine


Armane T. Wilson, Alfred I. Du Pont Institute, Wilmington, February 18, 1959.

Chien Liu, Associate Professor of Pediatrics, University of Kansas Medical Center, February 25, 1959.


New Grants and Contracts

From the United States Public Health Service for:

- Equipment for the new medical science research building $90,000
- Dr. Dan H. Moore's etiological studies of mammary carcinoma $41,124
- A training program in the anatomical sciences by Drs. Dan H. Moore and Keith R. Porter $28,836
- Dr. Paul A. Weiss's cinemicrography of cell interactions in culture $19,442
- The characterization of certain proteins by Dr. Alexander G. Bearn $16,221

From the American Cancer Society in support of the following work:

- Studies of the physiological and biochemical basis for autonomous growth of plant tumor cells by Dr. Armin C. Braun $31,333
- Dr. Clara J. Lynch's study of certain aspects of spontaneous and transplanted leukemia upon strains of mice maintained only in her laboratory $13,653

From the National Science Foundation for basic research entitled, "An electrophysiological study of knife fishes," by Dr. Alexander Mauro $9,000

From the Muscular Dystrophy Associations of America for Dr. Arpad Csapo's studies on excitation-contraction coupling in muscle $8,802
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