

The
Rockefeller Foundation

Annual Report
1951

THE ROCKEFELLER
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⁵ Effective December 5, 1951.

⁶ Successor to the International Health Division Board of Scientific Consultants, May 1, 1951.

⁷ Effective May 1, 1951.

⁸ Division of Medicine and Public Health was formed by the merging of the International Health Division and the Medical Sciences, May 1, 1951.

⁹ Retired May 31, 1951.

¹⁰ Effective June 1, 1951.

¹¹ Effective December 5, 1951.

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¹ Retired June 30, 1952.

² Effective April 2, 1952.

³ Successor to Board of Scientific Consultants for the Division of Medicine and Public Health, April 2, 1952.

⁴ Successor to the Advisory Committee for Agricultural Activities, April 2, 1952.

⁵ Effective January 18, 1952.

⁶ Effective July 1, 1952.

To the Trustees of The Rockefeller
Foundation

GENTLEMEN:

I have the honor to transmit herewith a general review of the work of The Rockefeller Foundation for the years 1950 and 1951, together with detailed reports of the Secretary and the Treasurer of the Foundation and the Directors for the Divisions of Medicine and Public Health, Natural Sciences and Agriculture, Social Sciences, and Humanities for the period January 1, 1951 to December 31, 1951.

Respectfully yours,

CHESTER I. BARNARD
President

THE
PRESIDENT'S REVIEW
for 1950 and 1951

PRESIDENT'S REVIEW

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PRESIDENT'S REVIEW

FOR 1950 AND 1951*

STATISTICAL SUMMARY

FOR 1950 AND 1951

FOR reasons made evident below, the Review for the year 1950 was not published in 1951. The present Review therefore covers both 1950 and 1951. The following statistical summary is for both years. The details will be found in the Annual Report for 1950 published in 1951, and in this Annual Report for 1951.

The Foundation's income during 1950 was \$12,828,195, and during 1951 it was \$16,972,914 — a total return of \$29,801,109 for the two years. The income for 1951 was the largest ever received in a twelve-month, the previous high record being \$14,746,495 in 1929. The market value of the Principal Fund at the end of 1951 was \$315,070,601.

The applications for aid received during 1950-1951 totaled approximately 7,500. Grants and appropriations were made to assist some 1,200 projects.

* Received for publication June 18, 1952.

The grants and appropriations for the two years were distributed as follows:

	1950	1951
Public Health	\$2,326,840	\$3,796,270
Medical Sciences	1,240,900	
Natural Sciences and Agriculture	2,092,515	3,680,208
Social Sciences	2,122,085	4,586,895
Humanities	1,491,250	1,658,072
General Education Board	—	5,001,625
General	477,500	680,526
	<hr/>	<hr/>
	\$9,751,090	\$19,403,596
Administration	1,496,874	1,755,284
	<hr/>	<hr/>
	\$11,247,964	\$21,158,880

At the end of 1951 the Foundation's professional staff, including executive officers, totaled 91, and the number of clerical and other personnel was 147 — a total of 238 employees.

A TIME OF TRANSITION

The years 1950 and 1951 were for The Rockefeller Foundation a period of world survey, self-examination and adjustment to the changing conditions of a world in transition; and during the time these processes of reorganization were under way, it was impracticable to attempt any definitive discussion of plans and programs. For that reason the annual Review of the preceding year's work was omitted in

1951, and the present recapitulation will therefore span two years.

Actually, plans and programs are continually under appraisal. The Foundation, from the beginning, has conceived its role to be that of a pioneer and a supporter of pioneers; and with an assignment as broad as "the well-being of mankind throughout the world," resilience to change is a practical necessity. The wants of mankind are multitudinous. The resources of The Rockefeller Foundation are limited — indeed, they are but as the Biblical grain of mustard seed compared with the myriad wants. Because of this disparity, only those wants which represent critical needs and which provide opportunities for service in fields that are germinal to human well-being on a wide scale can be regarded as appropriate objectives for support. The great volume and variety of the requests place a grave responsibility on the Foundation's Trustees and Officers, who select, from among the numerous applicants and the wide range of opportunities, the particular ones that are to receive assistance. This sense of responsibility makes the process of appraisal and reappraisal necessarily a continuous one, and at the same time explains the exceptions to program which occur every year.

The stream of events and experiences which gives consciousness of the passage of time has been likened to the ceaseless flowing of a river. We are living in a period of history when the river seems to move with the speed and weight of an avalanche, bringing changes so radical and far-reaching that the whole of civilization is shaken and terrorized. After winning

a world-wasting struggle against one form of totalitarianism, it is a bitter irony to find ourselves now confronted by another dictatorship that was our ally less than a decade ago. The luminous hope for the one world of mankind, which burned so brightly during the war, has been supplanted by a spreading fear of hidden treachery from within and surprise attack from without. Never has the world stood in greater need of calmness, wisdom and courage in the evaluation of its problems; and yet perhaps never before has the sense of urgency and impending panic gripped so many nations and peoples.

In this interval of armed truce — the twilight zone in which we exist, suspended somewhere between war and peace — what is the right course for men of good will to pursue? At The Rockefeller Foundation we have been asking that question during this critical biennium. By the definition of our charter we have had to view the question on the global scale, in terms of humanity as a whole; and our surveys of course have been projected against the background of nearly four decades of experience in administering the trust bestowed by Mr. John D. Rockefeller in setting up the Foundation in 1913.

SECURITY AND FREEDOM

One of the most difficult problems confronting philanthropic foundations, universities, churches and other institutions which are concerned with the intellectual, moral and spiritual well-being of mankind is the increase of restraints on individual and group

freedoms imposed in the interests of national security. Our way of life is built on freedom as its chief cornerstone. The code of morals prevalent in Western society rests on the twin pillars of the freedom and responsibility of the individual. At the same time, with international relations as tense as they are today, we have to face the fact of a discordant world. That fact makes necessary a sharper vigilance than was required in earlier, less complicated days, before the rise of Stalinism to the stature of a world power and the development of weapons of wholesale destruction.

It is as impossible as it is undesirable for an institution to avoid the problems which concern the society in which it lives. The ivory tower attitude would be as unreasonable as the iron curtain attitude is. Recognizing the necessity for security, and admitting also the difficulties of attaining it, what adjustment can be made that will preserve the life of the mind and yet not endanger the safety of our nation?

Scholars are sometimes charged with making a fetish of academic freedom, but this is not a fair or useful appraisal of the position of scholars and scientists. Most of us who administer the affairs of The Rockefeller Foundation are not practicing scholars in a strict professional sense, and many of us never have been; but for nearly 40 years the Foundation has been closely associated with the academic institutions and with the creative minds of research and learning on both sides of the Atlantic, in the Near East, in India and China. This puts us in a position

and under the obligation to express an informed opinion from a detached and relatively disinterested point of view. No doubt, sometimes professors, like others, say or write things that seem foolish under critical examination or appraisal with hindsight, or make dubious associations; and I should say that perhaps the sense of responsibility to institutional and public interest within the academic fraternity is not on the whole as mature as is desirable. Nevertheless, in a world in which so many of our activities in government, business, religion and other fields are largely and necessarily subject to formal coordination and hierarchical direction, the free discussion in the academic world becomes of increasing importance, as it does also in legislative halls, if democratic political institutions are to be maintained.

Our experience in fostering research and learning has made us believe that only the free mind can do really productive work in intellectual fields, either in research or teaching, and that the man or woman who has an ideological ax to grind is conspicuously less successful as a contributor of knowledge than one who is free of such a restriction.

Academic freedom is not a concept promoted to favor a selfish interest or to maintain a position of special privilege. Freedom to inquire, to observe, to theorize, to exchange ideas and experiences, to criticize, is essential to fundamental research. Science is largely rooted in the experimental method. But unless the experimenters are able to communicate their findings to fellow workers — unless they can freely meet with their peers in research and discuss their

results, relate their findings to what other investigators have found, obtain the discipline of competent criticism and be challenged to defend and prove their conclusions — in short, unless they are able, in John Milton's phrase, "to utter and argue freely," their contributions are likely to suffer avoidable defects. And this freedom is necessary to the fullest production and the correction of error, not only in science but equally in scholarly pursuits in art, literature, industry and business. It is the essential freedom which anyone must have if he is to do creative work of any kind.

Having made that affirmation, we have to recognize that in the present state of world relations there is a special problem. And we must treat it as such — we cannot disregard it. This special problem is presented by the fact that some areas of research directly involve the national security. In these areas the scholar's traditional liberty "to utter and argue freely" can no longer be granted as an inalienable right but is subject to restriction in the interests of the nation and society. A scholar may object that he cannot fulfill his responsibility in research unless he can freely communicate with other scholars and share their discoveries. In that case it is his responsibility to the nation and society either to accept the restriction, recognizing it as an unavoidable evil, or else to withdraw from the sensitive area and work in some other field which does not involve weapons or other factors related to security. And, on their part, the nation and society must recognize that secrecy is costly. By shutting off communication among scien-

tists, they may impair our scholarship, our discoveries and development in the very fields they seek to protect.

It has not been the practice of The Rockefeller Foundation to inquire into the politics, religion, skin color or racial origin of applicants for its grants and fellowships. The only personal criteria by which it judges eligibility are two: the applicant's technical competence and his integrity as a scholar. The first requisite to intellectual integrity is an open mind.

Scientists have learned through long experience that they must take facts as the facts present themselves — all the facts, without favoritism, the “ugly” fact along with the “pretty” fact. For every trial of nature reveals something of nature's hidden meaning; and though the result often is different from what was expected, it can be understood only by considering all the facts. “In the face of a fact,” remarked Professor P. W. Bridgman of Harvard University, “there is only one possible course of action for the scientist, namely acceptance, no matter how much the fact may be at variance with his anticipations, and no matter what havoc it may wreak on his carefully thought-out theories.”

This commitment to follow the fact, irrespective of where it may lead, is the universal sign of membership in the fellowship of research. In exchange for his dedication of himself to the search for truth, society grants the scholar certain immunities. But when he becomes a partisan in his search, when he accepts the dictation of external authority as to how he shall interpret the phenomena, and selectively slants

his observations and colors his conclusions to support an approved hypothesis, then a man ceases to be a scholar. He has made himself something else, by no means necessarily inferior or useless — a journalist, a propagandist, a statesman. Having sacrificed his freedom to a party line, he has disqualified himself for research and shut himself off from its immunities.

The Rockefeller Foundation is concerned in part with the life of the mind, the outreaching of the human spirit, as fundamental to the well-being of mankind. It is committed to the advancement, not in one place but throughout the world, of particular spiritual realities which experience has shown can contribute to human well-being. Within the framework of our government's legitimate controls, and recognizing the areas in which restrictions are necessary, we shall continue to search for true scholars in the fields of our programs in whatever lands they exist. Through fellowships, grants in aid and appropriations for the support of research, creative work and the application of knowledge to the alleviation of human needs, we shall continue, as in the past, to work through gifted individuals or small groups of individuals. The great society — the "mankind" of our charter — and the innumerable lesser societies of nations, cults, classes, professions and associations which make it up are themselves in turn constituted of small groups and individuals. And the mass decisions of the great society, the pattern of beliefs, morals, tolerances, prejudices and behavior which characterize its culture, are determined in the last analysis by the decisions arrived at and attitudes and understandings

prevailing in the small groups. Irrespective, therefore, of the magnitude of the project which is to be undertaken or of the size of the grant which is to finance it, we must work perforce with small groups, such as university departments, laboratory teams and individuals, who are both technically competent and intellectually free.

SURVEYS AND ANALYSES

Immediately following the German surrender which terminated the conflict in Europe, officers of The Rockefeller Foundation began to resume contacts with institutions and individuals of the war-isolated countries. Grants were made to relieve acute situations in universities and other outposts of research and learning, to replenish gaps in libraries, re-equip empty or obsolescent laboratories and, what was perhaps the most important of all, to break through the intellectual blackout imposed by the war and restore the commerce of ideas which is so vital to the advancement of learning and the promotion of understanding and fellowship among peoples. Many of these postwar actions, however, were in the nature of temporary measures, to meet obvious pressing needs. It was realized that the legacy of dislocations and upheavals left by the war called for more than improvisations. There must be a complete re-examination of the existing program, a survey of the human situation in terms of its postwar setting and a rethinking of the charter obligation to serve "the well-being of mankind throughout the world."

The Foundation was then functioning, as it had been for many years, through an organization of five divisions: 1) the International Health Division, working in the broad field of public health; 2) the Medical Sciences division, devoted to the promotion of research in medicine, with particular attention to studies related to psychiatry; 3) the Natural Sciences division, with a program largely concentrated in experimental biology; 4) the Social Sciences division, concerned with problems of interhuman relations; and 5) the Humanities division, occupied with studies and creative work in literature, linguistics, history, philosophy, drama and other humanistic fields. Although each division was necessarily working in selected areas of its field, this fivefold organization provided a framework which encompasses the greater part of the intellectual interests of mankind.

The directors of these divisions were asked to canvass their respective fields of interest in the light of postwar conditions. Several of the officers made extended visits to key centers in Europe, Asia and Africa for on-the-spot observations.

A special commission of population experts was organized and dispatched to the Far East to study problems of human congestion in lands where they are most critical. Indeed, human ecology, the relation of man to his environment, was deemed so fundamental to the whole planning operation that an officer of the International Health Division was detached from his regular duties and deputized as a special assistant to collect and correlate data on population studies and advise the President of the Foundation on the

status of knowledge in this field throughout the world.

As a pilot study in human ecology, a survey was made of Crete, with the cooperation of the Greek government, using the island community as an isolated society for examining the interrelations of population growth, health conditions, agricultural production, nutritional standards, water supplies and other natural resources.

An Advisory Committee for Agricultural Activities, which had been organized during the war in connection with the agricultural development program in Mexico, made a survey of the needs and opportunities for similar work in other countries.

Finally, in the spring of 1950, a commission was appointed to review the organization and program of the International Health Division, as well as its relation to agricultural work. The commission was asked to make recommendations for planning the future operation of the division, taking into consideration relations not only to public health problems but also to those in the medical sciences and agriculture.

This Commission on Review of the International Health Division, to give its official name, was made up of seven present or former Trustees of the Foundation: Mr. Walter S. Gifford, Dr. Robert F. Loeb, Mr. Henry Allen Moe, Mr. William I. Myers, Dr. Thomas Parran, Mr. John D. Rockefeller, 3rd, and Mr. Walter W. Stewart; three officers of the Foundation: Dr. Alan Gregg, Mr. Warren Weaver and Mr. Joseph H. Willits; and 12 members drawn from outside institutions: Professor Richard Bradfield of

Cornell University, Dr. Dean A. Clark of Massachusetts General Hospital, Dr. L. T. Coggeshall of the University of Chicago, Professor Gordon M. Fair of Harvard University, Dr. Wilson L. Halverson of the California State Department of Health, Professor Paul C. Mangelsdorf of Harvard University, Dr. Kenneth F. Maxcy of the Johns Hopkins School of Hygiene and Public Health, Dr. Hugh J. Morgan of Vanderbilt University, Dr. Hugo Muench of the Harvard School of Public Health, Mr. Fairfield Osborn of the Conservation Foundation, Professor Lowell J. Reed of the Johns Hopkins University and Professor E. C. Stakman of the University of Minnesota. All of these members, except Mr. Osborn, had a present or former responsible official connection with the Foundation.

The membership included public health officers and teachers; medical scientists, educators and administrators; natural scientists; agricultural specialists; economists and other social scientists; businessmen; and a conservationist. The group was carefully selected to represent every area of human interest which we thought would need to be considered in the course of the survey. The commission devoted a full year to the study, and the report which it made has become the chart and compass of our planning.

Three outcomes in particular resulted from this year-long survey:

First — The International Health Division and the Medical Sciences division, the two oldest branches of the Foundation, were merged in 1951 to form a single unified Division of Medicine and Public Health,

with a corresponding revision and integration of the program to focus the services of the new division directly on four critical areas of the health problem. I shall describe this fourfold program later in this Review.

Second — In the same year the Natural Sciences division was reconstituted as the Division of Natural Sciences and Agriculture, the change in name reflecting a shift in the emphasis of the program toward an increasing interest in the application of the natural sciences to agriculture.

Third — Beyond this consolidation and change of emphasis, the commission recommended a closer coordination of all activities of the Foundation. This could be accomplished, it pointed out, through the development of related programs integrated along the broad front of health, agriculture, education, social sciences and humanistic studies. It voiced the conviction that such coordinated action of all four divisions offers the surest approach toward a solution of the world problem of population growth and the attainment of adequate usable resources — a judgment in accordance with our belief that the broad basis of our planning should be human ecology.

HISTORICAL PERSPECTIVE

Before describing the current program of the Division of Medicine and Public Health, it may be helpful to sketch briefly the history of past efforts and accomplishments in these two closely related fields.

Public health was the earliest interest of the Foundation and, indeed, was the main interest that gave it birth. The Rockefeller Institute for Medical Research had been established in 1901 to assist the conquest of disease through increase of knowledge, and the General Education Board was founded in 1902 to advance education in the United States "without distinction of sex, race, or creed." In the course of developing its educational plans, an officer of the Board learned of the prevalence and debilitating effect of hookworm disease throughout wide areas of the South and at once realized that education could make only limited headway among populations infested with this chronic infection. Inquiry disclosed that the nature and cause of hookworm disease were known, an effective cure was known and sanitary measures for preventing the spread of the disease were known. And yet, except for individual efforts here and there where enlightened physicians were treating individual patients, little was being done to put the knowledge to use. The immediate outcome of this discovery that knowledge was lying idle in the face of a great need for its application was the launching of the Rockefeller Sanitary Commission in 1909. Subsequent experience taught that this knowledge was not as well known as was supposed. The effort involved more than the mere application of a complete body of existing knowledge. This has been a repeated experience of the Foundation.

A campaign for eradication of hookworm disease, waged by the Rockefeller Sanitary Commission in 11

southern states, not only restored tens of thousands of anemic men, women and children to health and cleared whole regions of the disease, but it provided a demonstration of how a community could tackle a public health problem and master it. There was wisdom, too, in the decision to conduct the campaign on a cooperative basis, as a joint project of the government, state and county, on the one hand, and of the private agency, the Sanitary Commission, on the other. This idea of cooperative effort became a guiding principle in all subsequent activities of the Rockefeller boards and has contributed in no small measure to their success.

Not only in the United States, but throughout the world, the public health movement was given powerful assistance by that wise decision of 1909 to put an existent body of knowledge to work. For when, four years later, Mr. Rockefeller established The Rockefeller Foundation — and his decision was influenced in large measure by this successful demonstration in the South — the first act of the Foundation was to incorporate the hookworm fighters into its staff as the International Health Board. This group of workers, which later became the International Health Division, was immediately commissioned to carry the fight against hookworm to infested lands of both hemispheres. Soon it added malaria and yellow fever control to hookworm work and extended the warfare against disease to include the recruitment and training of public health officers and nurses, the support and conduct of scientific research

in public health, aid to state and local health services and, eventually, the building of public health schools and institutes of hygiene in more than a dozen strategic centers of the Americas, Europe and Asia. The total Foundation expenditures for these efforts, from the beginning of the program in 1913 to the end of our survey in 1951, was \$100,800,000.

Meanwhile, beginning only a little later, was a parallel interest in general medicine. This program was first directed at the strengthening of teaching in medical schools and was conducted through a Division of Medical Education until the late 1920's. During this period the General Education Board also was deeply concerned with the improvement of medical education, but its charter confined its operations to the United States, whereas the Foundation was empowered to work anywhere. Thus, while the General Education Board was pouring millions into up-building a score of American medical schools distributed over the country, the Foundation was equally active in financing medical school developments in Canada, Brazil, Great Britain, France, Belgium, Syria, China, Southeast Asia and Australia. These ventures in medical education had thoroughly demonstrated their value by 1929, and in that year the emphasis of the program was shifted from education to research, with particular reference to psychiatry, neurology, endocrinology, human genetics and other specialties related to psychiatry. With this change in program the division was renamed the division of Medical Sciences, and as such it operated

until the merger with the International Health Division last year. The total expenditures of the Foundation for medical education and research in the medical sciences, from 1914 to the end of our survey in 1951, was \$123,800,000.

Now, in all these activities, both those in public health and those in medical education and research, the Foundation had been a trail blazer, an experimenter, if you will, an advance guard moving across the frontiers of the known, trying out the new knowledge, sponsoring new methods in research and education, and passing back the results of its experiences. In the venture against yellow fever, for example, which had begun with the appointment of its yellow fever commission in 1916 and had been continued through extensive field studies in Africa and South America, through the establishment and operation of a research laboratory in New York, and with the close cooperation of the public health authorities of Brazil, Colombia, the British Colonial Service, Nigeria, Uganda and other native governments of Africa, the Foundation's scientists had isolated and identified the causal agent of the disease and had then through a long series of experiments with this virus developed an effective vaccine. The more than two decades of work, which cost the lives of six scientists and the expenditure by the Foundation of nearly \$14,000,000, reached a culmination in the development of a practical method of culturing the virus for large-scale production of the vaccine — a result that was accomplished just on the eve of

World War II. In consequence, the Allied commands were able to assign millions of troops to service in the tropics in the assurance that they were protected against yellow fever.

Further investigation will doubtless unveil additional facts about yellow fever, but the Foundation believes that the pioneering job has been completed. Indeed, even before the review commission began its survey, research on yellow fever had been terminated, and staff members who had participated in the long fight were engaged in writing a definitive history of their work. This monumental book of some 700 pages, edited by Dr. George K. Strode, was published in 1951 under the title *Yellow Fever*. In the same year the Nobel Prize in Physiology and Medicine was awarded to Dr. Max Theiler, a staff virologist who had been a key member of the team which developed the yellow fever vaccine. These two events, the publication and the award, may be viewed in a symbolic sense as marking the end of an era. They coincided closely in time with the merger of the old divisions and the adoption of a new program.

The new program, which was agreed on in 1951 and is now in process of being developed along four fronts, has as its objectives: 1) the advancement of professional education, 2) the study of medical care, 3) the investigation and control of specific diseases and deficiencies, and 4) the development of the health sciences. Each of these headings represents a broad field of interest, and it is by careful selection of the specific problems to be attacked in each area that the

program becomes pertinent to the present world situation.

PROFESSIONAL EDUCATION

Most of the nations outside of North America and Europe are sadly deficient in medical personnel, and this lack stems directly from the lack of modern medical schools in these regions. To be sure, in many of the countries one finds physicians of top quality, but usually they are persons who obtained their professional training in Europe, the United States or Canada. Training abroad, however, is costly; fellowships can be provided only for the occasional brilliant student who shows unusual promise; and, moreover, the number of outside applicants for whom places can be found in American and European schools is narrowly limited. The only permanent solution of the problem is the development of first-class training centers within the countries themselves. It was recognition of this acute situation that led the Foundation to put *professional education* first in formulating its program in medicine and public health.

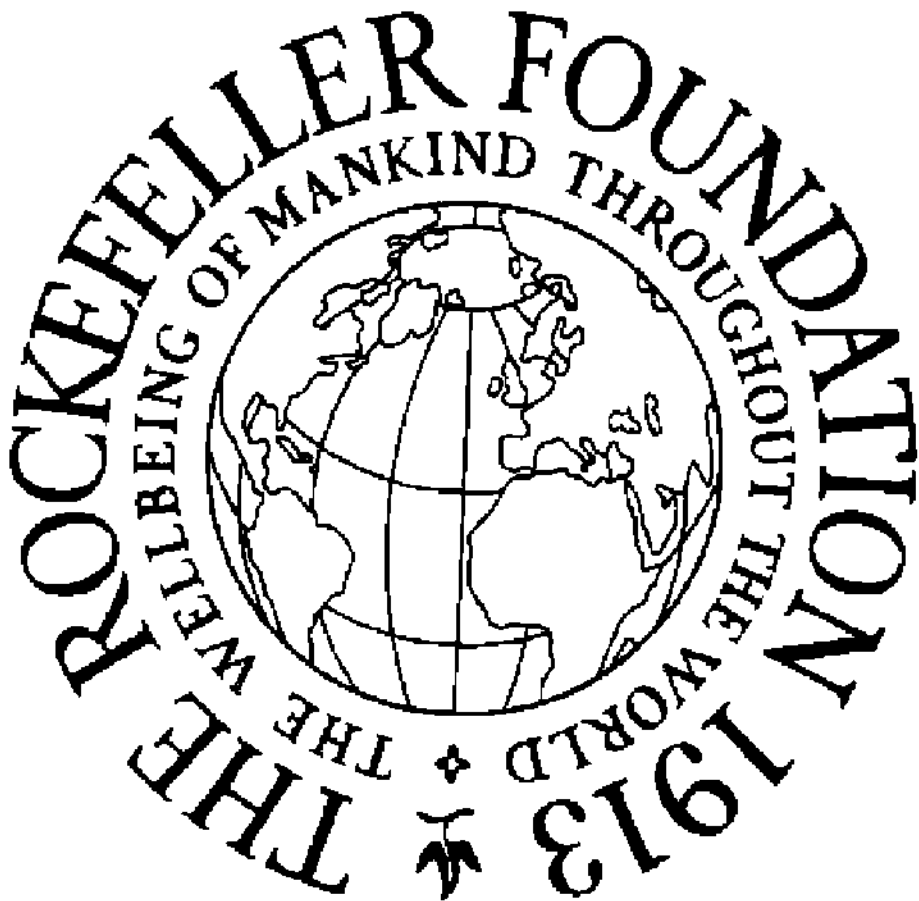
The return to education naturally calls to mind the large-scale activities of the former Division of Medical Education back in the 1920's, but I should hasten to explain that the present program is conceived in a different framework from that of the former one. It is not our plan to make large appropriations for buildings or endowment; the plan is projected on a qualitative rather than a quantitative basis, with the idea of using relatively modest grants at strategic places



Photograph Excised Here

Pach Bros., N. Y.

Dr. Max Theiler, who received the 1951 Nobel Prize in Physiology and Medicine for discoveries in connection with the yellow fever vaccine



Virus investigations at
the Walter and Eliza
Hall Institute of Med-
ical Research, Mel-
bourne, Australia

The Argus, Melbourne

Photograph Excised Here

Staff conference at the
University of São
Paulo's Laboratory for
Cell Physiology



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within a faculty to strengthen its teaching. There is a recent instance in South America in which a department of physiology was developed through a series of grants in aid; the resulting superiority of teaching and laboratory work in physiology spurred other departments to higher standards and in consequence raised the level of the entire medical school. An officer of the Foundation is now in South America making an exploratory survey of the status of medical education in the various lands of that continent. Additional surveys in other regions are planned. The program contemplates assisting the training not only of physicians but also of public health nurses and sanitary engineers.

MEDICAL CARE

How to make available to the entire population the preventive, diagnostic and curative services of modern medicine is a key problem of contemporary society. In commending this subject of *medical care* for intensified systematic study, the Commission on Review of the International Health Division recorded the following observations:

Technical difficulties in the broader application of medical knowledge and skill are immense. Worst of all, serious impediments have been placed in the way of experimenting with new methods of financing and of organizing medical service. Progress in this field, therefore, faces not only the problems raised by scientific and technical inadequacies but also vigorous organized resistance to change. Both research and

statesmanship are required if the great benefits of medical science are to be brought effectively to the service of the people. Too little attention, furthermore, has been given to the problem of quality of service that can be rendered. There is, too, a great need to tie preventive medical care into the general program. . . . The commission therefore urges the Foundation to devote an adequate share of its funds to support careful, objective studies and teaching in medical care, and particularly to support well-designed experimental programs and field demonstrations, under voluntary and public auspices, aimed at developing sound methods for the distribution of medical care, in the belief that only through such strong measures can the technical, social and political obstacles to adequate distribution of comprehensive medical care of high quality be overcome.

On this recommendation, medical care has been made one of the four major concerns of the program in medicine and public health, but the fact is that the subject has been a Foundation interest for more than two decades. As long ago as 1928 it financed the comprehensive survey conducted by the Committee on Costs of Medical Care. In subsequent years grants were made to several other organizations interested in various aspects of medical care, and in 1945 a staff member of the International Health Division was assigned to survey postwar operations and trends. His report, based on visits to health centers and consultations with authorities in the United States, Canada, Great Britain and Sweden, provided a valuable summary of working principles and showed

up the need for specific information as a basis for planning, organizing and administering. It was mainly to obtain actual facts on public demand for medical care, organizational requirements and operating problems that the Foundation in 1946 began a series of grants now totaling over \$500,000 to the Health Insurance Plan of Greater New York. This organization, which provides health insurance to various groups of city employees, labor unions and other agencies, including the employees of the United Nations in New York, has served as a pilot plant for medical care on a community scale. It has provided a working demonstration of medical care, operated under private auspices, in a large metropolitan population center.

We know vastly less of the problems and requirements in a rural setting, and one of the main undertakings of the new program will be to support studies in sparsely settled communities. The recent reorganization and enlargement of the University of North Carolina School of Medicine at Chapel Hill has opened an admirable opportunity. Here is a medical school in a small town, in a state which is predominantly rural. It is now a four-year school, and schools of dentistry and nursing have been added to the university. Thus Chapel Hill has a well-rounded medical center, one which has assumed the responsibility of lifting the level of medical care for the entire state. It has established a professorship in medical care. A planning committee has been appointed, and the Foundation made a grant in 1952 to finance the work of this committee whose job is to survey the

state's needs in the field of medical care, appraise the university's resources and needs and then submit a comprehensive plan through which the necessary service can be rendered.

The Foundation's program in medical care will be concentrated mainly on training and research, giving special attention to the support of studies in the biosociology of disease. This is a greatly neglected field. Medical schools as constituted today require of their matriculants no knowledge of the social and political conditions related to disease and health, a situation in marked contrast with their stiff requirements in fields of the natural sciences. The old idea that biophysics and biochemistry would eventually unravel all the problems of health and disease is less tenable today than was the case 40 or 50 years ago. There is a growing realization that interrelated social factors outside of the physics and chemistry of the body are also involved. These biosocial relations are foremost among the frontiers that must be explored and mapped before we can expect to have adequate medical care for the entire population of a community. When research has accumulated and systematized the data into a scientific discipline, biosocial medicine may become an indispensable part of the school curriculum. We may expect medical schools then to introduce students to the practice of community medicine with an emphasis on "social diagnosis" comparable to that on physical diagnosis.

The Foundation's program in medical care will be concentrated mainly in the United States and will be restricted to scientific aspects of the subject. Despite

the mounting political and social pressures for altering the existing systems of producing and distributing medical care, there is a dearth of information of the sort necessary for the intelligent comparison of the competing proposals. The Foundation will not concern itself with arguments about the relative merits of different schemes, whether governmental or private. It will confine its efforts to the support of objective studies, to ascertaining facts and to making known the findings.

THE UNKNOWN VIRUSES

Under the heading *specific diseases and deficiencies*, the program in medicine and public health is being directed at the study of virus infections of the types which are transmitted by mosquitoes, ticks, lice and other insects. These infections include some of the least understood and most predatory microbial invasions to which the human body is subject; therefore, the field is one that stands in need of investigation. It was recognized, moreover, that the Foundation's long experience with the yellow fever virus gave its staff an exceptional training for work with other insect-borne viruses. An additional detail was the fact that in the course of the extensive surveys which the International Health Division conducted in its search for yellow fever in the jungles of East Africa, West Africa, Brazil and Colombia, the field workers discovered 18 viruses of unknown identity. These discoveries were made in the period 1937 to 1948, and as each virus was found, it was

preserved in frozen tissue and transferred to the Foundation's laboratories in New York.

Here then was a whole collection of fresh virus material awaiting attention; and so the current research at the New York laboratories, which the Foundation operates in one of the buildings of The Rockefeller Institute for Medical Research, has been focused on the study of these unknown agents of unknown diseases. Preliminary studies have brought to light many striking differences. Although all are invisible in the optical microscope, it is possible to obtain images of the viruses with the enormous magnifying power of the electron microscope, and these reveal a wide range of sizes. The ultracentrifuge shows that they vary also in weight, from the Semliki Forest virus, which is small and of light weight, like the agent of yellow fever, ranging up to the gigantic Bwamba fever virus, which is dozens of times heavier. Similarities have also been found; no fewer than six of the viruses appear to have some kinship with agents which are already known to cause disease in man and in animals. Although the studies have not progressed far beyond the preliminary stages, enough has been glimpsed to suggest that this research may be expected to yield much new knowledge of virus nature, as well as of the specific diseases which the unknown agents transmit.

Two recent developments have been 1) the dispatch of a staff member to Cairo, Egypt, to cooperate with a United States Naval medical research unit in a survey of the major virus problems of Egypt, and

2) the establishment of a virus research laboratory at Poona, India, in collaboration with the Ministry of Health of the Indian government. Two members of the Foundation staff have been assigned to Poona, other workers are being provided by the ministry, and the laboratory is now in process of being set up in a building of the local medical school.

Last December, \$350,000 was designated to support virus research in 1952 — \$150,000 for the New York laboratories; \$125,000 for projected studies in Africa, South America and elsewhere; and \$75,000 for the virus research laboratory in India.

DEVELOPMENT OF THE HEALTH SCIENCES

Under this final heading of the fourfold program, provision is made for such additional medical and public health projects as the developing concept of human ecology may make opportune. On this point the Commission on Review expressed its opinion that:

The problem of population is certainly one of the most challenging within the area of interest of The Rockefeller Foundation and should receive the support of the Foundation on the broad front of health, agriculture, education, the social sciences, and humanistic studies. All of these must work together if the patterns of population growth are to be identified and scientific means for the direction and control of growth are to be discovered and applied. It was felt that although a program of this kind would

require a long period of careful development, and that the costs would be considerable, a beginning could be made within the existing sphere of operations of The Rockefeller Foundation.

The *development of the health sciences* therefore designates an inclusive category for projects in medicine and public health which contribute to the desired ecological point of view and yet cannot be classified under professional education, medical care or the study of specific diseases. For example, the 1951 grant of \$100,000 to the University of Oregon Medical School for research in constitutional medicine may be listed under this heading. Similarly, several grants made during the biennium for studies of child psychology, child growth, child guidance and other aspects of the development of the human individual are essentially contributory to the promotion of the health sciences. The medical studies of old age, correlated with the studies of sociological and economic problems of aging supported through the Division of Social Sciences, also belong in this category. Numerous other projects now active could be mentioned; and doubtless many new ones will be taken on as the program advances and the unifying principle of human ecology penetrates more deeply into our thinking and planning.

The Division of Medicine and Public Health combines the staffs of the two former divisions, and at the beginning of 1952 totaled 50 persons. This includes members of the staff of the divisional laboratories in New York, in addition to divisional officers

at the European office of the Foundation in Paris and others of the field staff stationed in various foreign countries. The new division is both an operating agency, conducting research with its own personnel, and a fund-dispensing agency, making grants to universities and other institutions. Dr. Andrew J. Warren, formerly an Associate Director of the International Health Division, was appointed Director of the consolidated division in 1951.

THE NATURAL SCIENCES

Although the Natural Sciences division was not formally set up until 1928, the Foundation's interest in this branch of knowledge dates back almost another decade. The first assistance was voted in 1919 in an appropriation of \$50,000 to the National Research Council to provide fellowships in chemistry and physics to young Americans and Canadians who had reached the postdoctoral stage of education. This fellowship program, which soon was expanded to include biology and other natural sciences and mathematics, has been continued in unbroken succession ever since, financed by the Foundation and administered by the council. Up to last year some 1,100 natural scientists had been given advanced training on these National Research Council fellowships at a cost of \$4,267,539. It is doubtful that any equal expenditure of funds has yielded such rich returns. Former fellows now occupy many important

posts in research and teaching, several preside over universities and four have been awarded Nobel Prizes.

After the Natural Sciences division was established, several years were spent prospecting various fields of physics, chemistry, biology and related sciences, and it was not until 1933 that the decision was made to concentrate the program on experimental biology. Experimental biology is concerned with the constitution, structure and function of living things and of the parts which make them up. It was felt that of all the natural sciences this one, dealing with life itself, was then in the greatest need of support and gave promise of increasing man's knowledge of himself. Both the medical sciences and the social sciences stood to gain useful knowledge from the findings of experimental biology; there was therefore an important element of unity in the choice. Moreover, the life sciences were less advanced toward the ideal of exact quantitative knowledge than was the case with chemistry and physics. Few universities had adequate endowment for biological research, and outside sources of funds were few and limited. This was the situation in the early 1930's, when the Foundation decided to make experimental biology a primary concern.

In the two decades since that decision, there has been a remarkable development in the methods of biological investigation. The change is especially marked in the application of physical tools and techniques, such as the ultracentrifuge, the electrophoresis apparatus, spectroscopy, X-ray diffraction, the

electron microscope and isotopic tracers. Through grants and fellowships the Foundation contributed to the development of some of these tools of research and to the application and extension of all of them to biological problems. The Foundation funds available for support of experimental biology have rarely exceeded \$2,000,000 a year; but by careful appraisal of the specialties to be aided, and of the workers in those specialties, the funds have been put to effective use in many strategic places.

Among the specialties in which research has thus been catalyzed, in carefully selected small groups here and there in Europe and the Americas, are genetics, embryology, cellular anatomy and physiology, biochemistry and biophysics. These are the present-day frontiers of the life sciences, and they are the very fields in which experimental biology has made its most fruitful recent advances. Indeed, the search for the secret of life, growth and reproduction has been pushed beyond the cell and the organic components of the cell to the very molecules which make up these components. Today, in many of the Foundation-assisted laboratories of enzymology, endocrinology, protein structure and nucleic acid research, experimental biology has become molecular biology.

It was natural and inevitable that as research in biology yielded findings which could be put to work in medicine, agriculture and other applied fields, it would attract new and increased support. Another factor was the development of the atomic bomb. The spectacular announcement of this powerful weapon

dramatized the vast gap which exists between man's understanding of physical forces and his understanding of animate nature, including man. The harnessing of nuclear energy highlighted this disparity on a frightening scale and is responsible for at least some of the postwar intensification of interest in the contributions of biology.

A review of the outside funds which are now available to universities and other institutions for basic research in biology shows that the total is around \$25,000,000 a year. This is 10 to 12 times the amount that was available 19 years ago when The Rockefeller Foundation entered upon its program. Most of the increased support comes from sources which did not exist as fund-dispensing agencies at that time, such as the National Foundation for Infantile Paralysis, the National Science Foundation, the Office of Naval Research, the Office of Air Research and the grants program of the United States Public Health Service. In addition, many of the large pharmaceutical manufacturers have stepped up their laboratory programs in basic research, and some of them regularly make systematic grants to universities for fundamental investigations in biology.

Recognizing this radically changed pattern of circumstances affecting the support of biology, the Foundation last year made a searching re-examination of its program in the natural sciences. The questions raised were twofold:

First, in view of the large funds which were now available from other sources, was the Foundation justified in continuing to concentrate its efforts on

A Fulani herdsman tends his cattle at a rainy season camp; the International African Institute is studying the culture of Fulani-speaking people in West Africa



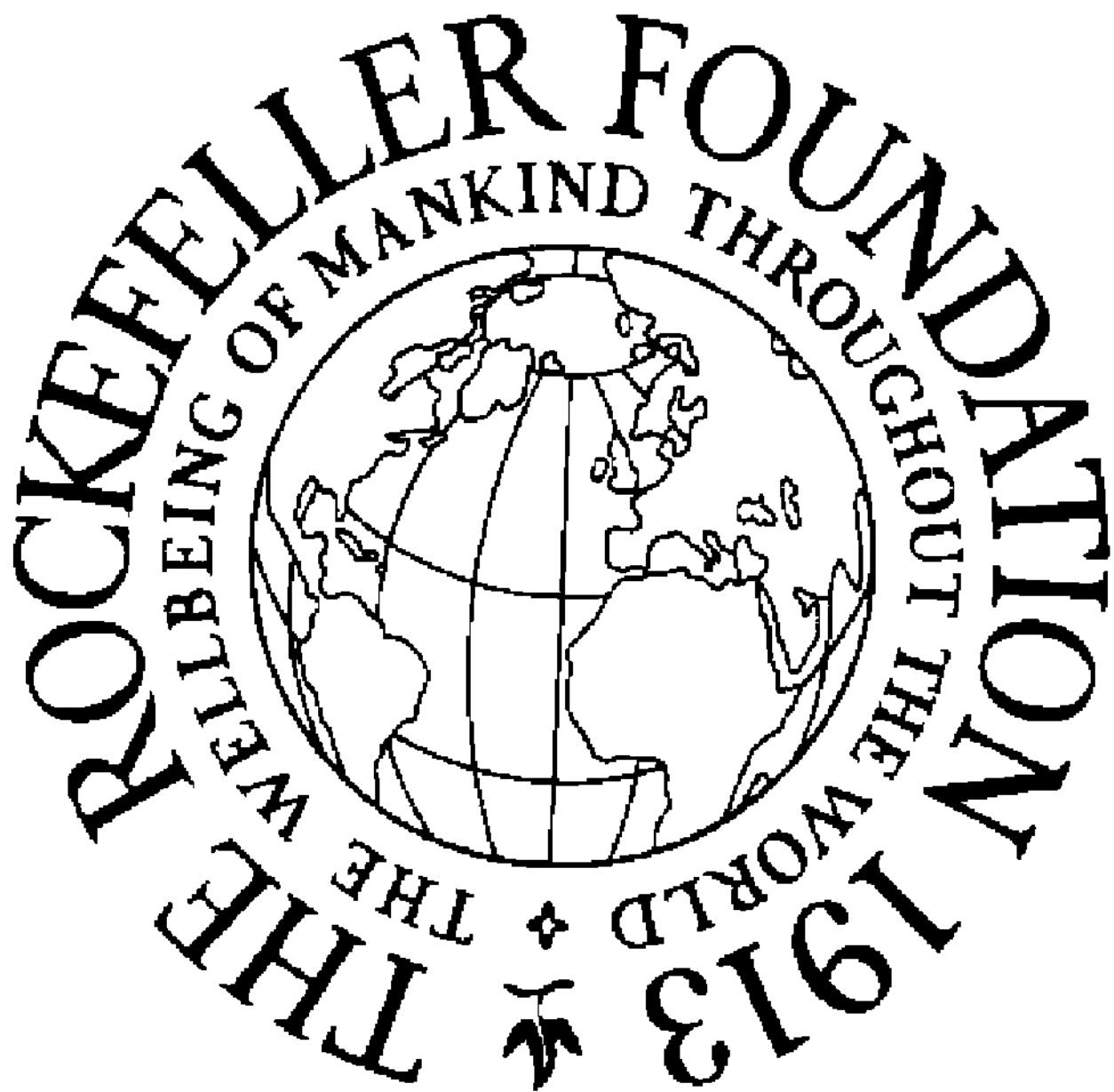
Photograph Excised Here

Darrell Fordt

Unloading specimens for the Marine Biological Laboratory, Woods Hole, Massachusetts, which has received Foundation support



Photograph Excised Here



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Comparing the yield of test varieties of corn at the Agricultural
Experiment Station, Palmira, Colombia

experimental biology, especially within the United States?

Second, was there not some other field of activity within the knowledge and experience of the Foundation which offered a first-class opportunity to do another job in pioneering?

These considerations have led to a shift in emphasis, a decision that was arrived at by the Trustees at their semiannual meeting in December 1951. According to this decision, experimental biology will continue to be an active interest of the natural sciences program, but on a reduced scale in the United States, and the greater part of the effort will hereafter be devoted to the promotion of scientific agriculture.

AGRICULTURAL DEVELOPMENT

The Foundation has been operating a program in agricultural research and development in Mexico since 1943, conducting it as a joint project with the Secretariat of Agriculture and Animal Industry of Mexico. The success of this demonstration below the Rio Grande has made a favorable impression on other republics of Latin America. Several governments have requested the Foundation to conduct similar programs in their countries, and in 1950 a project for the improvement of corn and wheat and other basic food crops was begun in Colombia. Under the revised program for the natural sciences referred to in the preceding section, operating projects in scientific agriculture similar to those in Mexico and Colombia

will presumably be extended to certain other countries. The Board of Consultants for Agriculture visited the South American continent in the spring of 1952 in response to invitations received by the Foundation from various governments. They, in consultation with Foundation officers, have made an on-the-ground appraisal of the opportunities for cooperative projects.

Perhaps I should explain that this program in agriculture, as developed in Mexico, later extended to Colombia and now to be introduced in other lands of our southern neighbors, is an operating program. That is to say, the Foundation itself employs plant geneticists, breeders, pathologists, entomologists, soil scientists and other agricultural specialists and sets the group up in well-equipped laboratories where it operates as a unit of the Foundation staff. In Mexico, where the project is organized as the Office of Special Studies within the Secretariat of Agriculture and Animal Industry, the laboratories have been established on the grounds of the College of Agriculture at Chapingo, with numerous experimental plots scattered over the various states of the republic. As of the end of 1951, the staff here consisted of 11 American scientists employed by the Foundation and 55 Mexican scientists assigned by the Secretariat. In Colombia, where the project also represents a collaboration with the Ministry of Agriculture, the Foundation employs a staff of three American scientists (soon to be increased to six), and the laboratory facilities are divided between two national colleges of agronomy, one at Medellín and the other at

Palmira, and government laboratories in Bogotá. As at Chapingo, close cooperative working relations are maintained between the Foundation staff, the two agricultural faculties in Colombia and government scientists.

Now the primary objective of all these operations in agriculture is eminently practical, although they are expected to contribute to scientific knowledge. The Foundation embarked upon its initial project in 1943, with the direct purpose of increasing the yield per acre of the Mexican food crops as well as increasing their quality. The improvement of corn was tackled first, to be followed by programs for improving wheat and beans. Today, after nine years of collecting varieties and crossbreeding them, high-yielding stocks of corn, rust-resistant wheats and improved varieties of beans have been developed. The seeds of these better-yielding cereals and legumes are being distributed to the farmers through government agencies, and each year larger areas are being planted to the improved varieties. Corn yields have been increased up to 25 per cent in many localities. The introduction of rust-resistant wheat has made it possible to grow this cereal profitably despite the epidemics of fungus disease which occasionally sweep over adjacent fields that are still planted with the traditional varieties. In addition to improving the stocks of food crops, the project has made contributions to Mexican agriculture through studies of forage crops, native soils, green manures and other fertilizers, plant diseases, insect pests and insecticides and fungicides. Animal husbandry is being added to

the program in 1952, beginning with chickens and swine, and in time we intend to include both dairy and beef cattle.

The Mexican Agricultural Program is now operating on an annual appropriation of about \$320,000 from the Foundation, with additional funds provided by the Mexican government. Since making its preliminary survey of Mexican agricultural needs and opportunities in 1941, followed by the inauguration of the project in 1943, the Foundation has spent \$1,727,905 on this undertaking.

The Colombian project was started with an appropriation of \$40,000 in 1949, which was followed by \$50,000 in 1950 and \$135,600 in 1951. It has benefited in many ways from the pioneering in Mexico. For example, some of the new varieties of wheat which our plant breeders developed for Mexico through several years of experimentation there, have proved to be remarkably well adapted to Colombia. Practically speaking, they can be transplanted from Mexico to Colombia without the necessity of cross-breeding or other time-consuming experiments. This fortunate adaptability is true also of some of the new varieties of corn, though to a lesser extent.

While the Mexican project will continue to operate at its present level as a developmental program for Mexico, we plan to use it as a hub for training and, as it were, seeding the extension of the work to other countries. The men who are operating the program in Colombia were trained on the job in Mexico, and the personnel to man the proposed projects in other Latin American countries will similarly be trained

through a year or more of experience on the staff in Mexico. Last December \$60,000 was allocated to the Mexican project for the development of new personnel to be assigned there in 1952.

The new program in agriculture is therefore primarily an extension of the demonstration made in Mexico. We are not assuming that it will be practicable to reduplicate the Mexican project in every country with which we cooperate. Conditions of soil, climate, law and customs vary from one region to another, and necessarily each project must be tailored to fit local needs, preferences and other circumstances. At the same time, we expect that the experience gained in Mexico and the pattern of operation developed there will be applicable to other lands of Latin America, as proved to be the case in Colombia.

There is another facet to our program. Agricultural improvements derive from new discoveries in the sciences which are basic to agriculture. Genetics underlies plant breeding; mycology and virology are involved in many diseases which afflict crops. Hormones, enzymes and other physiologically active chemical compounds affect plant life no less than animal and human life. We therefore intend to make use of opportunities to assist projects in the fundamental sciences which bear directly on the improvement of agriculture.

THE STATE OF MEXICO PROJECT

The shift in the natural sciences program to give increased emphasis to agriculture has an ecological connotation. Population problems are affected not

only by the incidence of disease, but also by the supply of food, by the availability of water and power and by the state of education and technology. Usually disease problems are studied by one group under one set of conditions, while the food problems are the concern of another group of specialists working in another setting. This compartmentalization is no doubt necessary to get at certain facts and to take effective action, but in actual life all the problems are present simultaneously, and each impinges on the others in the framework of a population. From an ecological point of view, it would be highly desirable to study the whole complex of situations affecting a community — problems of disease and health, problems of food production and nutrition, and the other social problems which arise in this business of many thousands of people rubbing elbows with one another. Fortunately, an opportunity to make an integrated study of this kind presented itself last year in an application from the State of Mexico.

The State of Mexico is one of the 28 states which constitute the Republic of Mexico, and a few months ago its governor proposed a six-year plan for agricultural development. Making his wishes known through the Mexican Secretariat of Agriculture and Animal Industry, Governor Sánchez Colín requested the collaboration of The Rockefeller Foundation in working out the plan and putting it into effect. The project calls for the establishment of a state office of agriculture, a state agricultural experiment station and demonstration farm, and seven extension zones, all to be coordinated in a state-wide move-

ment to improve farming methods, agricultural production and rural life. Examination of the plan showed at once that this was a project closely in line with the objectives of the Foundation's agricultural program, and the request for cooperation was warmly welcomed. An appropriation of \$100,000 was made in December to help finance the agricultural aspects of the plan for three years, and the project is now in progress.

But the program is not restricted to one interest. In addition to calling on the services of our agricultural experts, Governor Sánchez Colín welcomed the advice of our medical scientists on problems of sanitation, hygiene and health and of our social scientists on opportunities for home industries, domestic science education and other social factors of rural life. An officer of the Division of Medicine and Public Health has already visited the area and made a preliminary survey; a consultant of the Division of Social Sciences is at present engaged upon a survey of the social problems involved. The way is thus open for a program expressing a coordinated "human ecology" approach to the entwined problems of food, health, education and social relations, and possibly other factors, in a population that is predominantly rural.

NATURAL SCIENCES AND AGRICULTURE

During the six postwar years the grants made for experimental biology and related fields of science, but not including the agricultural programs in Mexico and Colombia, averaged \$2,000,000 a year. The funds

were voted to institutions in a number of countries, and the annual geographical distribution followed this pattern:

United States	\$1,150,000	58 per cent
Europe	400,000	20 per cent
Latin America	400,000	20 per cent
Elsewhere	50,000	2 per cent

A further analysis of the items shows that of the \$1,600,000 annually distributed in the United States, Europe and "Elsewhere," 80 per cent went for projects in experimental biology, about 10 per cent for the general support of science (such as the National Research Council fellowship programs), and the remaining 10 per cent for special projects (such as the 200-inch telescope on Mount Palomar). In Latin America the breakdown is somewhat different. This program is entirely separate from the agricultural programs in Mexico and Colombia and is conducted through grants made to Latin American universities and other institutions. Analysis of the distribution of the \$400,000 shows that about 70 per cent went for agricultural projects, 20 per cent for experimental biology and 10 per cent for the physical sciences.

Under the revision of program, which was authorized by the Trustees in December 1951, the Foundation has reduced the allotment of future funds for distribution in the United States and intends by a tapering process over the next several years to fix the annual budget for the United States at about \$500,000. This will involve the termination of support to activities which have been carried through the pioneering stage and which should now obtain

adequate support from other sources. It will also remove the Foundation from quasi competition with other agencies for the privilege of supporting projects which are generally accepted as deserving and which therefore can look to one or more of several sources for funds. Apart from these, however, there are certain types of desirable and important ventures in experimental biology which might have a hard time obtaining support, even in the presence of large sums for other purposes; and it is projects of this venturesome and imaginative kind which warrant continued attention and support from The Rockefeller Foundation. They may require particular flexibility and promptness in handling, and they may involve sums and terms of years which are not available to other organizations.

The conditions which prompt the reduction of program in the United States do not apply to Europe. On the contrary, the need there warrants an increase from the present annual level of \$400,000 to at least \$500,000. And the need is matched by the opportunity, for some of the most venturesome and imaginative work in experimental biology today is being done by European investigators, working in some cases with meager equipment and under heavy economic burdens.

There are unlimited possibilities in Latin America. Here we look for opportunity to strengthen research and teaching in whichever of the natural sciences it may be found. From the present level of \$400,000 a year we think it may be feasible and justifiable to enlarge the grant-dispensing and fellowship program

in Latin America to a scale of \$700,000 within the next few years. A sizable proportion of this aid would go to universities and professional schools to upbuild their departments of agriculture.

The operating programs in agriculture constitute the final element of our plan. The Mexican and Colombian projects between them, with the additional grants made for training personnel, now account for \$500,000 or more of Foundation appropriations annually. It is expected that the new operating projects to be developed in Latin America will eventually require an additional \$1,000,000, bringing the annual total to \$1,500,000.

Looking forward, then, three or four years hence, we anticipate that the distribution of funds through the Division of Natural Sciences and Agriculture will, in round numbers, follow this pattern:

United States	\$500,000	15.5 per cent
Europe	500,000	15.5 per cent
Latin America	700,000	22 per cent
Operating Agriculture	1,500,000	47 per cent

Several years must necessarily elapse before the new operating projects can be located, manned, equipped and brought to full development. The intervening time will be used as a period of transition to taper the program in the United States to the magnitude which seems appropriate in the light of changed circumstances at home and the presence of these significant opportunities abroad.

Mr. Warren Weaver, who has directed the Natural Sciences division since 1932, continues as Director

of the enlarged Division of Natural Sciences and Agriculture. Mr. J. G. Harrar, who was in charge of the Mexican Agricultural Program from its inception in 1943, has been appointed Deputy Director for Agriculture, with headquarters in New York.

GENETICS — BIOCHEMISTRY — CONSERVATION

The grants made for projects in the natural sciences during 1950-1951 numbered 116, and of these 88 fell within the program in experimental biology.

Fourteen of the biological grants and 15 grants in aid went for work in genetics and totaled \$557,848. These funds were distributed in varying amounts among the following institutions: Columbia University, Cornell University, the Genetics Society of America, Virginia Polytechnic Institute, Northwestern University, Princeton University, the Universities of Indiana, Texas and Wisconsin, Smith College and Washington University (St. Louis) in the United States; the Institute of Genetics at Gif, France; the University of Vienna, Austria; the University of Copenhagen, Denmark; the University of Lund, Sweden; the University of Edinburgh, Scotland; University College, London, England; the University of Dublin, Ireland; the Universities of Naples and Pavia, Italy; the University of Zagreb, Yugoslavia; and the Universities of Brazil, São Paulo and Paraná. In size, the grants ranged from \$200,000 to Indiana University, to assist the studies of Professors H. J. Muller, Tracy M. Sonneborn and Ralph E. Cleland, to \$850 to the University of São Paulo, to purchase

a few simple items of field equipment for the work of Professor Warwick Kerr. It is of further interest, I think, that Professor Muller is studying fruit flies, Professor Sonneborn the paramecium or "slipper bug," Professor Cleland the evening primrose, and Professor Kerr the honey bee, while the project at Cornell is concerned with maize and one at Wisconsin with the colon bacillus and other bacteria. It is through the technique of the many-sided attack that the geneticists are progressively unveiling new knowledge of heredity.

While the Natural Sciences division has concentrated its support in this field on fundamental genetics, a program which necessarily involves lower organisms as the subjects for study, the Medical Sciences division has given considerable assistance over the years to genetical studies of man and other mammals, and grants and grants in aid under its program during 1950-1951 came to \$293,034. Thus, through the two divisions, more than \$850,000 has gone to genetics in the biennium.

But our largest area of interest in experimental biology has been biochemistry, including enzymology and the study of protein structure. In the two years 43 grants and 38 grants in aid totaling \$1,469,665 were made. The largest amount to a single institution was \$168,615 to the Polytechnic Institute of Brooklyn toward financing an intensive attack on the problem of protein structure launched in 1950 under the direction of Dr. David Harker. This question, how the tens of thousands of atoms are arranged in each case to form the giant molecules of albumin, insulin,

hemoglobin and the numerous other specific proteins which function in the body, is perhaps the key problem of biochemistry. For when chemists have unraveled the structure, they should be able to understand the mode of action of these vitally important substances. Dr. Harker's project is the most recent of many studies of protein analysis which have been supported. The structures are so complicated and the analysis so intricate that the problem calls for sallies from many different fronts.

Enzymes are proteins, but they are such a distinct class that their study constitutes a science in itself. Enzymes are the catalysts of life, molecules which promote the processes of digestion, respiration and other biochemical interchanges without themselves entering into the reactions — and biochemists estimate that thousands of different kinds of enzymes operate in every living cell. Fifteen of the grants listed under biochemistry, totaling \$589,000, were for the support of work in this important field. One of the largest, \$80,000 to Yale University, is to provide research assistance to Dr. Joseph S. Fruton over a five-year period. Other grants include \$55,000 to the Massachusetts General Hospital, where Dr. Fritz A. Lipmann is working on the mechanism of enzymatic energy exchanges, and \$35,000 to the University of Sheffield, England, for the work of Dr. Hans Adolf Krebs, whose contributions to our knowledge of sugar metabolism are a landmark in enzymology.

I must turn from these all too brief and necessarily fragmentary citations of work in experimental biology

to mention an outside project which was assisted because of its significance for human ecology. This is the program of the Conservation Foundation, an organization established in New York in 1948 under the leadership of Mr. Fairfield Osborn. Its object is to promote conservation of the earth's life-supporting resources — animal life, plant life, water sources and productive soils — through both research and education. Beginning with an initial grant of \$75,000 in 1949, The Rockefeller Foundation has given a total of \$202,000 toward its support. The Conservation Foundation has made rapid progress in the survey of water resources, and last year saw publication of *The Conservation of Ground Water*, a comprehensive book reporting the present groundwater situation in the United States. This study was conducted and the book written by Dr. H. E. Thomas, formerly of the United States Geological Survey. Other projected surveys include studies of soil erosion, of soil and nutrition relationships, of the management of livestock ranges, of the use of "trash fish" and other marine resources, and an ecological study of Alaska.

THE LITTLE AND THE BIG

There is a certain embarrassment in singling out specific grants for mention in this appraisal of the work. Space limitation dictates that one confine the account to specimen projects, but it is always a question which particular projects are most deserving of such prominence. The temptation is to select

those which involve the largest funds, but I am not sure that this is the most reliable measure of either present importance or future significance.

The correct yardstick for any decision granting aid is the principle of adequacy. How much does the applicant need to accomplish the purpose of his project? It may be that he needs only an improved microscope or other piece of equipment, or a supply of mice with which to conduct a series of tests, or a fund of a few hundred dollars with which to buy chemical supplies or to fill some serious gaps in his working library. He may need a fellowship or a travel grant to enable him to spend a year working with one of the great masters in his field of knowledge. Perhaps the applicant needs a laboratory assistant and has in line a promising young apprentice in his class of post-graduates whom he would like to appoint to the job but can find no margin in his budget to care for the additional salary. Any one of these needs, which seem almost trifling in a budget of several million dollars, may in the course of a few years prove to have been a turning point in the career of a scientist or in the work of an institution.

A biochemist who now occupies a top position in an eastern university recently remarked that a grant of \$650, made 12 years ago to build a magnet for his study of chemical structure, played a decisive role in shaping up his research career. If we work with gifted individuals and small groups, we must be prepared to make small grants to meet individual needs. Moreover, when the grant is a large one, the recipient has to break it down into small allotments

for distribution among the small groups which constitute the over-all organization. It is these small groups, and not the director or organization as a whole, that do the work.

On looking over our files recently, my eye was caught by the records relating to a young neurosurgeon who first attracted the attention of the Foundation about 25 years ago. At that time he was an assistant professor in the Columbia University College of Physicians and Surgeons. McGill University at Montreal, needing a man to teach neurosurgery in its medical school, picked this assistant professor. The director of the Division of Medical Education of the Foundation agreed to give the appointee a fellowship to enable him to spend six months at the University of Breslau, in preparation for his new responsibilities. At Breslau he studied focal epilepsy under the distinguished Professor Otfried Foerster, and the fellowship grant that made this possible amounted to only \$2,784. Measured by the yardstick of dollars, it seemed a diminutive sum to appropriate for the advancement of neurology in Canada or anywhere else. But measured by the yardstick of adequacy, it was exactly what was needed.

The young man of the fellowship was Dr. Wilder Penfield, and the Foundation next appropriated \$85,000 to assist the development, over a four-year period, of a program of surgical research at McGill, including studies in neurosurgery under Dr. Penfield. Before the four years were up, however, Dr. Penfield and his associates had conceived a much larger venture for the advancement of neurology and were

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drawing plans for a modern institute to be devoted to research and clinical practice in this field. The Foundation agreed to contribute \$232,652 toward the building and equipment fund and pledged \$1,000,000 toward endowment; and after this Montreal Neurological Institute came into use, our Trustees voted additional funds to support specific studies in the institute — bringing the total of the grants to \$1,441,252. But it all started with that fellowship award of \$2,784.

A Foundation officer, visiting a leading British chemist a few years ago, mentioned that a grant had been recommended for one of his colleagues. "That's splendid," commented the chemist. "His work richly deserves it," and then he added, "Don't spoil him, though, will you?" From a financial point of view there are many ways of spoiling a scientist, and they run all the way from giving too little help too late to giving too much too soon. How large to make a grant must be judged in terms of local usage, of local needs and of local academic environment. A green plant requires carbon dioxide to manufacture food and to survive, but the plant will surely "drown" if the concentration of the gas becomes too high for its particular tolerance. Just so with the scientist. He will not long survive if he must dilute his research effort in a constant endeavor to find funds for equipment, for supplies and for salaries. But just as surely he will "drown" if these funds are so concentrated that he feels under pressure to produce proportionate results and has to defend himself among his associates because the level of outside aid seems to have signaled him as an extraordinary fellow.

When the rule of adequacy is fairly applied, there will be both large grants and small ones, and either may turn out to be crucial in obtaining an important result.

THE SOCIAL SCIENCES

When research is turned to the study of human beings as members of a society, there arise differences of opinion regarding the relationship of questions of value to questions of fact. What is social science? Critics have posed this question, often as a challenge and sometimes ironically, with the implication that only those entities which can be measured on the centimeter-gram-second scale are admissible to the domain of authentic science. But surely the criterion in evaluating a subject for systematic study is not the degree to which it is measurable in exact quantitative terms, but the degree to which it contributes to man's knowledge of himself as a part of nature or alternatively the degree to which it affects man's well-being. Appraised on either scale, the social sciences are potentially of supreme importance. For it is here that we come face to face with the problems of man's behavior, his relations with his fellows, his intergroup antagonisms and cooperations — inter-human, interracial, intercultural and international.

The membership of the Social Science Research Council is made up of representatives of anthropology, psychology, history, economics, political science, sociology, statistics and related fields. Several of these are borderland fields. In anthropology, psychology and statistics, for example, the social sciences over-

lap the natural sciences. In history they become one with the humanities. Sociology and economics have their repercussions in medicine and public health, as many a practicing physician can testify from his experience in trying to treat various physical illnesses which arise from, or at least are associated with, the anxieties, frustrations and social pressures of civilizations. A member of our medical staff brought back from a recent visit to a southern city the story of a case of tuberculosis which cleared up as though by magic when the social stress which had been overburdening the patient was removed. The importance of studying biosocial relations and the need for social diagnosis become highly pertinent.

The social sciences occupy a central position in any comprehensive program in human ecology. Population studies are directly dependent on the knowledge and techniques developed by anthropology, sociology, economics and statistics. We expect to see increasing collaboration between the social sciences and other divisions in conducting ecological studies — such as the survey of Crete which was recently completed and the State of Mexico project which is now in its beginning.

The Foundation's program is not concentrated in any single field of social studies but seeks to assist all the disciplines which can contribute to one or more of these objectives:

- 1) The development of a science of social behavior
- 2) The application of social science to human problems

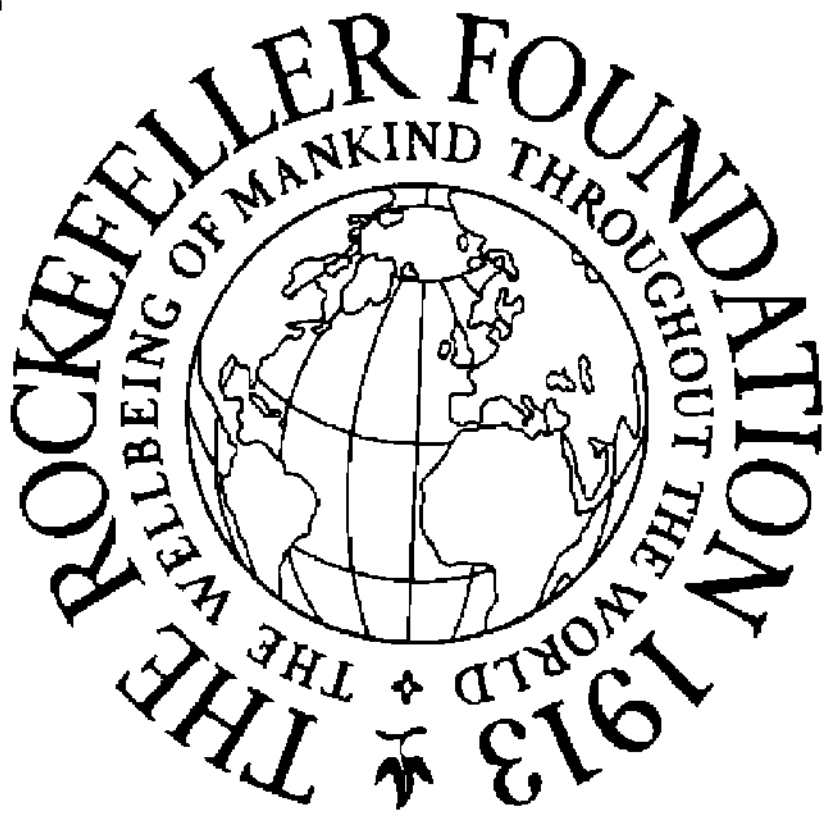
3) The discovery and development of social science talent

4) The establishment of a firm basis for social philosophy

There is admittedly a certain interdependence and interlocking among these objectives. Application depends on development; and the discovery and training of gifted young people to man posts in the social sciences will contribute to the goals both of development and of application. Even though the objectives are not sharply separable in practice, there is an obvious advantage in setting the goals down in 1-2-3-4 order. The aim is high, and the magnitude and complexities of the difficulties are not minimized; but the stakes are high too, and mankind will be the beneficiary of whatever is gained.

TOWARD A SCIENCE OF HUMAN BEHAVIOR

There is much confusion in the public mind as well as in academic circles as to the meaning of the phrase "social science" and as to whether "social scientists" may properly be regarded as scientists. Excepting some kinds of psychologists and anthropologists, social scientists are not admitted to membership in the National Academy of Sciences. Thus, "science" in this sense is a much more restricted category than one that would include the so-called social sciences. Some believe there is no such thing as a science of human relations, some that there can be no such thing. Professor Wigner of Princeton University goes so far as to say that no psychologist could understand theoretical physics, and very few



Photograph Excised Here

Sculpture class sponsored by Mayor's Advisory Committee for the Aged, New York City
Analysis of New York City real estate charts at Columbia University's Institute for Urban
Land Use and Housing Studies



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theoretical physicists could understand psychology—a statement that seems to imply that the difficulty is not the superficial one of difference in technical equipment and experience, but rather the more fundamental one of difference of view of reality, of epistemology, of metaphysical assumptions, of the criteria of validity.

This confusion is more confused by the variety of understandings and misunderstandings of the implications of the term “application of science.” At one extreme are those who imply that unless social scientists can apply their knowledge as “social engineers,” there are no social scientists or at least no social sciences. At the other extreme are those who imply that if there is a science it almost automatically applies itself—the social problems involved, such as social values, economics, politics, engineering, organization, management, being merely subsidiary or incidental.

These remarks are pertinent to the functions of the division of The Rockefeller Foundation known as the Division of Social Sciences. A review of the activities supported through this division, some of which are stated in the following pages, shows that they may be placed in the following categories: a) Those which, in my opinion, relate to strictly scientific effort. (This does not imply that there necessarily is a sufficient body of scientifically tested knowledge and scientifically usable theory to warrant the assertion that there is a social science.) b) Activities that are not scientific but are those rather of scholarly research, such as studies in economic

history. c) Those that have the character of the kind of inquiry or investigation made by men of affairs for purposes of decision or planning, leading to interpretation and evaluation rather than to scientific knowledge. d) Studies involving matter-of-fact, scientific knowledge, if available — interest and values leading to a philosophical orientation useful for intellectual interest or as expressing practical wisdom.

In the light of the above I should like to close the introduction to this section with some brief observations concerning scientists, science and the application of science chiefly growing out of my experience in the Foundation.

First — A scientist is an individual who attempts to secure knowledge by observation or experiment or both, with a high degree of detachment or objectivity, his observations or experiments being susceptible at least in principle to scrutiny or repetition by others under similar conditions. He constructs concepts and tests hypotheses for this purpose; and where the data are sufficient he tries to construct theories consistent with the data that promote the further acquisition of knowledge and facilitate communication on his subject. In general, his perceptions are more accurate and his discriminations finer than those of laymen who happen to have an interest in the subject matter; and by training and experience he is able to use effectively intellectual and other tools as a whole not ordinarily available to others for the same field of inquiry. It is not necessary that the scientist have available to him a science in the

sense given below. Thus, Newton was a scientist helping to found, though he did not have available at the time, a science of mechanics or physics.

On this view there are, in my opinion, many engaged in studies of human behavior and relations who are genuine scientists.

Second — A science is a substantial or relatively “dense” body of knowledge: 1) validated in general by criteria accepted by the relevant group of scientists; 2) in general interconnected and self-consistent; 3) integrated by a theory or theories accepted by most scientists of the time as useful for further development of knowledge and its communication; and 4) associated with a living, active group of scientists who use it.

In this conception I do not think there are as yet any social sciences. This does not mean that there will not be such sciences. Moreover, in the last 15 years great progress has been made in examining human beings and their behavior directly, in contrast to armchair philosophizing on assumptions about human nature or about the structure of vast complexes of social aggregates.

Third — There can be no talk of applying a non-existent science. But if, as some insist, there are now social sciences, or if, as I expect, there will be, then one is confronted with the frequent assumption that the application of social science is quite a different matter from the application of the physical or biological sciences. This is allegedly due to the intrusion of values — customs, politics, conflicts of economic

and other interests — in the case of applied social science, and their nonintrusion in the case of applied natural science. Scientists, and sometimes engineers, lend credence to this assumption by the habit of eliding all that occurs between the availability of a scientific idea or a body of scientific knowledge and the end product of its application — a thermionic tube and its mass production; a working radio transmitter and receiver and their production and distribution in quantity; a test tube phenomenon and therapeutic penicillin; the discovery of the malaria plasmodium and its life cycle and the suppression of malaria by the wholesale destruction of the anopheline vectors of this protozoan.

Between any science and its application to human purpose, i.e., its utilization for the realizing of values, there impinge alternative values and interests, invention, organization, management, regulation, patents and other factors, which have to be harmonized and integrated — a matter frequently of great difficulty even when serious conflicts of interest and controversy are not especially important, as in much engineering. The possible important difference between application of a social science and of a natural science may be that controversial attack in the former case is likely to be against the science itself or its formulated theories, whereas in the case of a natural science the attack more exclusively will be on the *means* of application rather than on the science itself. However, the past conflicts on the theory of evolution, the present Soviet view of genetics and the opposition

to immunology by some groups are instances to the contrary.

PROJECTS IN ECONOMICS

In support of research in economics, \$400,000 was appropriated to the National Bureau of Economic Research in 1950. This grant continues a long-term program of assistance to the bureau by the Laura Spelman Rockefeller Memorial and The Rockefeller Foundation, dating back to 1922, and now totaling more than \$5,000,000.

Another grant in economics, \$140,000 to Harvard University, is financing a study of the economic structure under the direction of Professor Wassily Leontief. Professor Leontief uses input-output analysis, a technique which relates the distribution of the output of one industry to that of other industries and also the contributions which the other industries make to one particular industry. The Foundation's grant, made in 1951, will be used to refine the technique, applying it to analysis of changes in the economic structure. The United States Air Force is also making a substantial contribution to this research, which promises important applications to government economic policy.

Six grants and grants in aid, totaling \$122,750, were made to the Food Research Institute of Stanford University during the biennium. A portion of these funds is for completion of the five-year study of world operations in food and agriculture in World

War II, a large-scale program involving the labors of economists in several countries (in addition to the staff at Palo Alto), toward which the Foundation made a grant of \$300,000 in 1946. The results of this study are reported in a 22-volume history which is now in the process of publication by the Stanford University Press. A smaller portion of these funds is for the completion of the institute's study of Soviet economic development, begun in 1948 with a grant of \$25,000 from the Foundation. An additional project begun by the Food Research Institute last year, supported by \$41,000 from the Foundation, will analyze the factors responsible for changes in consumption levels and living standards of the "sugar islands" during the last half-century. The islands to be studied are the Hawaiian Islands, Puerto Rico, Jamaica, Guadeloupe, the Cape Verde Islands, Mauritius, Reunion, the Fiji Islands and New Caledonia.

THE INTERNATIONAL SCENE

With the enigma of Russian intentions still the top problem in world politics, the Russian Institute of Columbia University's School of International Affairs continues to be a key center for research and training in this field. Its two-year course, requiring familiarity with the Russian language and providing intensive postgraduate instruction in the history, economics, law, politics and culture of Russia, has in five years supplied the United States Army, the Department of State and other government services with more than

100 trained men. Staff members are frequently called on to lecture at the National War College, the Air War College and outside universities. Earlier grants for the institute, which was established in 1946, totaled \$362,000; and in 1950 the Foundation appropriated an additional \$420,000 toward support over a five-year period.

An important aid to contemporary research on Russia is the *Current Digest of the Soviet Press*, a weekly publication which carries English translations of significant articles selected from the leading Russian newspapers and magazines. The *Digest* is published under the auspices of the Joint Committee on Slavic Studies of the Social Science Research Council and the American Council of Learned Societies. The Social Science Research Council, as fiscal agent, is receiving a special grant from the Foundation to care for production costs.

A postwar development of the Brookings Institution is its International Studies Group, organized in 1946 for research, education and publication on questions of American foreign policy. Directed by Dr. Leo Pasvolsky and using a technique which it calls "the problem method," the group has held ten seminars in various parts of the United States for university teachers, advanced students, government administrators and journalists. To date some 800 university professors have shared in foreign policy analysis through participation in these seminars. Research activities are reflected in a number of books, notably in the annual *Major Problems of United*

States Foreign Policy, which has been adopted as a textbook at West Point, Annapolis and various universities and colleges. A projected study which is now in the planning stage will analyze the basic framework of international relations, including the fundamental concepts and objectives of the major nations, patterns of economic behavior, political attitudes in international relations, the channels and instrumentalities of national action, and in general the whole pattern of internal and external factors which condition the international scene. Since the International Studies Group began six years ago, the Foundation has appropriated \$480,000 toward its program, including \$180,000 in 1950.

STUDIES OF AGING

The progressive extension of the average span of human life, the increasing percentage of the population that is over 65 years of age, and the growing practice of early compulsory retirement pose a wide range of problems. Society is attempting to provide pensions and old-age assistance, but with a good deal of confusion as to methods and ignorance as to costs. Moreover, granting pensions to old people reaches only one side of the problem. The continued utilization of persons whose prime is past but who wish to produce according to their powers and tastes is desirable for society and essential to the dignity and self-respect of the individual. There are other aspects of the human, economic and political problems of

old age which need systematic study, and in recent years the Foundation has given its support to several research projects in this field.

The University of Chicago's Committee on the Study of Later Maturity is investigating representative samples of older people in selected occupational and retired groups to determine the meaning and function of work in their lives. The group has also made a survey of the retirement practices now in use in American business, with a view to discovering patterns which provide a more flexible arrangement than the typical scheme of retirement at a fixed age.

Another study which is also operating under a grant from the Foundation is being conducted at the University of California under the joint direction of Professor Clark Kerr, economist, and Professor Lloyd Fisher, political scientist. Both economic and political aspects of the question are under inquiry here, and the investigators are also interested in physiological and psychological measurements of aging as contrasted with the inflexible chronological measure by years.

Some 600,000 citizens of 65 years and older are concentrated within the metropolitan area of New York City, and here, aided by a Foundation grant, the Mayor's Advisory Committee for the Aged is making a pilot study of the human-adjustment problems presented by this segment of the population.

Still another study was undertaken by a group at Cornell University under the direction of Professor Edward Suchman. Using the city of Elmira as a field

laboratory, the Cornell investigators made a cross-sectional survey of several hundred elderly persons with particular reference to their social adjustment. In addition to this initial study, which was begun in 1950 under a Foundation grant, Cornell has since launched three other research projects on different aspects of the old-age problem.

CAPITAL FUNDS FOR THE SOCIAL SCIENCES

The distinction in the terms "endowment" and "capital fund" as currently used by The Rockefeller Foundation should be noted. The word "endowment" connotes a permanent or long-term principal fund, the income from which is to be used for a specified purpose or purposes. While the present policy of the Board of Trustees does not arbitrarily prohibit grants for permanent endowment, the Trustees have recorded a strong reluctance to make grants for that purpose. In the case of what is referred to above as "capital fund" they have taken action to permit, with some restrictions as to the rate of expenditure, the use of principal as well as income after five years. For appropriations of substantial amounts of this character the term "capital fund" is now used, meaning that the gift may be retained as an endowment fund if the recipient so desires, or may be used up at its election, subject to certain time restrictions. In recent years the Foundation has made no endowment or capital fund gifts, except a gift in 1947 to the China Medical Board, Inc.; and

whether it does so depends upon many factors, such as the state of its principal fund, the rate at which ordinary appropriations are depleting principal, the market value of assets, etc., and, in general, the policy of the Trustees from time to time with respect to the use of principal.

In December 1951, a grant of \$1,500,000 was made to the Social Science Research Council as a capital fund to be held intact for ten years. Added to the numerous previous grants voted to the council since its establishment in 1923, this brought the total of appropriations from the Rockefeller boards to more than \$10,000,000. But most of the preceding grants were for research projects, fellowships or operating budget. The latest grant is unique in that it becomes the beginning of a capital fund, to which it is hoped others will contribute. This action expresses the belief that the usefulness of this institution merits the security and independence that a capital gift implies.

In addition to the grant of capital funds, other funds to a total of \$615,000 were given the council last year for specific uses, including \$220,000 to finance fellowships through June 1953. This fellowship program has been one of the most important of the many useful operations of the council. It was started in 1925 with a grant from the Laura Spelman Rockefeller Memorial and continued under those auspices until 1929, when the Foundation assumed responsibility for the financing; to date, about 1,000 men and women have been trained through these

fellowships. Most of them are now active in social science research, many in places of responsibility and leadership; two are university presidents, and one was awarded the Nobel Peace Prize. An accounting shows that appropriations for the fellowships have totaled \$177,592 from the Laura Spelman Rockefeller Memorial, \$197,182 from the General Education Board and \$2,381,658 from the Foundation—a grand total of \$2,756,432 in Rockefeller grants. In addition, some \$1,200,000 from other sources has gone into the council's fellowships, most of it within the last five years.

THE LAW AND MORALS

The urgent need for developing a science of human behavior is nowhere more marked than in the warfare between crime and the law. It would seem that American lawmakers have given more systematic attention to the development of private law and of the public law relating to the regulation of economic operations than they have accorded the criminal code. The wide ramifications of organized crime, with its gangs and syndicates of interstate and even international scope, have made a mockery of law enforcement, especially in many of our cities, and the inadequacy of the law to cope with these conditions is an open scandal.

Recent grants totaling \$242,500 are enabling the American Law Institute of Philadelphia to mobilize the thinking of social scientists as well as that of

members of the legal profession in the preparation of a comprehensive criminal code for recommendation to the state and federal governments. The existing situation is confused by differences in laws among states and by inconsistencies within the states themselves. The philosophy underlying the criminal law needs to be re-examined both for internal consistency and for congruity with contemporary social philosophy. Several years ago the American Bar Association appointed a Committee on Organized Crime, and during the last two years the Foundation made grants totaling \$50,000 to the American Bar Association Endowment to support the work of this committee. It is seeking, in collaboration with a special committee of the National Conference of Commissioners on Uniform State Laws, to spot the loopholes in our existing laws and draft model statutes.

Justice Oliver Wendell Holmes characterized law as "the witness and external deposit of our moral life." Despite this high recognition, the moral philosophy of American law has received inadequate attention. By some critics this lack is attributed to preoccupation with the technology of the law and with current devices for political reform.

Perhaps the highlights I have cited from the past two years in the social sciences will give some impression of the enormous importance of work in this field, where the human being is both the subject and the beneficiary of the research. Altogether 111 projects were assisted in 1950, with grants totaling \$2,122,085, and 134 projects in 1951, with grants

amounting to \$4,586,895 — a grand total of approximately six and three-quarter million dollars for the biennium.

THE HUMANITIES

The program in the humanities, like that in the social, natural and medical sciences, has been subjected to review and revision in the light of present-day world developments. Beginning in the early part of 1950, the Foundation officers surveyed the wide range of opportunities in this diverse field. Obviously no program can cover or even touch all the humanities, for the subject matter embraces such varied interests as linguistics, literature, the drama, journalism, music, painting, sculpture, history, religion and philosophy. But with a central theme to give coherence and unity to the effort, it is practicable to make a selection of subjects which can be focused in one direction and brought to bear on a well-defined objective. The question then became: What choice of subjects, what combination of work in the humanities which is manageable within our resources, will best serve the needs of our contemporary world?

The outcome of this analysis was a selection and classification of humanistic studies under three headings:

First — *Language, Logic and Symbolism*, representing our long-time interest in the means and processes of communication

Second — *Intercultural Understanding*, with the effort directed at research on, and the dissemination of

knowledge about, certain selected cultures or groups of cultures which need to be better understood

Third — *Humane Values*, under which is gathered our concern for creative writing, literature, history, philosophy and work in the other arts.

LANGUAGE, LOGIC AND SYMBOLISM

In these three related subjects the humanities approach in modes of thought and analysis the stricter discipline of the natural sciences. Indeed, one of the projects sponsored under this program represents a definite alliance with physics, through its use of acoustics, and with biology, through its use of human physiology, in a study that is basically linguistic. This study is centered at Harvard University and is in the charge of Professor Roman Jakobson, an authority in Slavic linguistics and literature. Professor Jakobson has undertaken — in a five-year program under a \$50,000 grant — a detailed analysis and description of the Russian language. This involves study of the sounds of the spoken language. The functioning of the vocal cords, the laws of acoustics and the application of psychology, logic and criticism are all part of the research, which has the collaboration of specialists at the Massachusetts Institute of Technology and Northeastern University as well as of colleagues at Harvard. Beginning with the most complete analysis of the sounds of the Russian language, the study will pass on to problems of syntax and eventually to the higher levels of expression. It has been suggested that such an analysis may

facilitate the application to living languages of the mathematical theory of communication worked out by Mr. Claude E. Shannon and Mr. Warren Weaver. If this could be done with a representative sample of the living languages of the world, it might be possible to achieve a fairly complete description of the fundamentals of human speech. But that, of course, can be regarded only as a long-range objective. On the side of immediacy, the study will help in the teaching of Russian, which has been handicapped by insufficient analysis and inadequate description of many important aspects of the language. The results of this work should contribute, moreover, to the improvement of international communication and negotiation.

Various aspects of language structure and symbolism have been studied by anthropologists, linguists, literary critics, psychologists, sociologists and other specialists, but usually in a strictly compartmented fashion, each discipline working in isolation and keeping within its recognized preserves. A plan for an integrated study, bringing to bear the different points of view in a coordinated attack on the theory of language and symbolism, was launched at the University of Michigan two years ago, aided by a grant of \$69,600. Such topics as the growth of concepts, the powers and limitations of languages, the relationship between cognitive and noncognitive aspects of communication, and the role of communication in the arts and its relationship to personality are subjects of the study. Professor Charles L. Stevenson and Professor Paul Henle, of the Department of Philosophy, assisted by Michigan colleagues in

sociology and psychology, have been active in the project, which has also benefited from the contributions of visiting scholars from other universities.

Another project in the field of linguistics and logic had its origin in a visit that our Director for the Humanities made to Tokyo University shortly after the Japanese surrender. There Mr. Fahs met Professor Hajime Nakamura, an expert in the history, philosophy and languages of the Far East. Professor Nakamura was the author of an interesting study. He had taken a set of logical propositions found in the Buddhist scriptures and traced the changes that occurred as these ideas were transported from India to Tibet, then from Tibet to China, and finally from China to Japan. It was an analysis of what happened to ideas in translating them from one language and culture into a series of different languages and cultures. Professor Nakamura's study had been published in Japanese, and Mr. Fahs sent a copy of the two-volume work to Stanford University for appraisal. As a result of the interest shown at Stanford, the Foundation made a grant to Tokyo University to finance a sample translation into English of part of Nakamura's work. More than that, Stanford University invited Professor Nakamura to come over as visiting professor, and he spent last winter at Palo Alto in this capacity, participating in seminars and conferences.

INTERCULTURAL UNDERSTANDING

From the beginning of its program in the humanities the Foundation has been actively concerned

with the interpretation of contemporary cultures to one another. Until 1950 this interest was largely concentrated on the development in the United States of studies of Russia, the Far Eastern cultures of China and Japan, and the cultures of Latin America. Scholars and educational programs which were assisted during that period have played important roles in government relations with these countries and were of direct practical use to the Allied cause during World War II. But the pioneering has been done; several American universities now have well-established centers of research and training in these cultures; and the time has come, we believe, to shift our effort in the United States to less well-known cultures—such as, for example, the Near East, India, Pakistan and Southeast Asia. Outside the United States the needs are in many places different. There are countries in which Far Eastern studies have been neglected and need support; in other countries, such as India, a better understanding of the Near East may be important to world peace; and there are lands in which ignorance of the United States makes the introduction of American studies opportune.

In the study of Southeast Asia, an important start has been made at Cornell University. Cornell had already developed significant anthropological and other research interests in Thailand and wished to expand the scope of its work and enlarge its research and teaching capacities into a well-rounded program on Southeast Asia. The Foundation appropriated \$325,000 toward this plan in 1950, to enable the uni-

versity to add two professors to the staff, to provide fellowships for graduate students and to support field work over a five-year period. Field headquarters have been established at Bangkok, and a staff is working out of that center. Three lines of inquiry are under way: 1) the effects of technological and economic change on the peoples of Southeast Asia, 2) the effects of the United States and United Nations programs on the political structures and ideologies in the area, and 3) the status of Chinese and Indian minority groups in Southeast Asia. Professor Lauriston Sharp is in charge of the project, which combines a number of disciplines, including anthropology, sociology, economics and political science.

An important outpost of the movement for intercultural understanding is the recently established Institute of Islamic Studies at McGill University in Montreal. Dr. Wilfred C. Smith, an authority on contemporary Islam, is director, and both Muslims and Westerners participate in the teaching and research which touch on Muslim history, law, theology and literature of both the Near East and the Far East. Special research associateships and assistantships are offered to Muslim scholars who will be invited to spend terms in residence at McGill, and fellowships will be provided for qualified graduate students. The Foundation appropriated \$214,800 toward a five-year support of this work.

Japan, through the joint initiative of Tokyo University and Stanford University, has launched a program of American studies. It began with a four-week summer program at Tokyo University in 1950. Five

professors of Stanford University conducted the seminars, which were attended by more than 100 professors, deans and graduate students from all over Japan. The purpose, as outlined by Professor Claude Buss of the history department of Stanford, was "to develop new bases for intellectual cooperation between the United States and Japan" through encouraging among Japanese scholars "a wide acquaintance with American life and institutions." Four subjects were presented: History of American Thought, The United States and International Organization, The Role of the United States in International Economic Affairs, and Problems of American Democracy. Although planned for only four weeks, the interest of the participants was so great that the conferences and lectures were continued for a fifth week, and then the group transferred to Hokkaido University for another week concentrated on selected phases of American life. A similar series of seminars was held by Stanford professors in the summer of 1951, and a recent appropriation assures support through 1957. The grants, which now total \$194,000, were recommended as a joint action by our Division of Humanities and Division of Social Sciences. Before the war the Foundation supported programs on Japanese thought and life in several American universities, and these summer seminars in Tokyo represent an effort to do the same for Japan with reference to American thought and life. Another project, in which the United States shared the benefits with Japan, India, Pakistan, Thailand and other lands of the Far East,

consisted of two series of seminars for writers held by American visitors to those countries — one in the winter of 1950–51 conducted by Mr. and Mrs. Wallace Stegner of Stanford University, the other in the winter of 1951–52 by Mr. and Mrs. Paul Green of the University of North Carolina. The Greens gave special emphasis to the drama in their lectures and discussions, while the Stegners covered the field of literature in general, with the main emphasis on fiction writing. The purpose of this program was to encourage mature writing, to stimulate among writers a deeper sense of their role and responsibility in the development of their peoples and finally to help them realize that in meeting this responsibility they are not isolated but are members of a wide community of writers throughout the world who are interested in similar problems. Both of these tours of the Far East met with enthusiastic response in all the lands visited; in each country a local university sponsored the lectures and discussion meetings; and the reactions received from writers and students of writing have been very reassuring.

In earlier postwar years, as was reported in previous annual reports, groups of journalists and radio broadcasters from Germany, Japan and Korea were brought over for periods of exposure to American ideas and practices. Seminars were held at Columbia University, participated in by leading newspaper and radio men of the United States, and the visitors were given the opportunity to observe newspaper and radio operations in various cities. A somewhat similar

program for ten Austrian journalists was provided in 1950 through a grant to the University of Missouri School of Journalism.

Also similar, and yet different, is a program for artists from abroad sponsored by the Institute of International Education in New York. A wide range of the arts is represented among the 44 young persons of exceptional promise who were selected for these periods of acquaintance with American life. There were architects, painters, sculptors, dramatists, writers, composers and performers of music, and dancers from many parts of the world who were given the advantages of a stay of several weeks in the United States. Among the nations represented are France, Denmark, Italy, Greece, Turkey, Israel, Nigeria, South Africa, India, Indonesia, Japan, Peru, Uruguay, Argentina, Brazil, Haiti and Iceland. In addition to grants of \$48,905 to finance this project for artists, the Foundation contributed \$50,000 to the regular student exchange program of the Institute of International Education.

HUMANE VALUES

Of the three main sections of our program in the humanities, the activities contemplated under our third category, *Humane Values*, are the most difficult to define and the most delicate to put into effect. What we are thinking of here is the evaluations that people make or the attitudes they take which determine their decisions. Some of the attitudes are rational; many of them are nonrational. But in any

case, the individual continually finds it necessary to try to bring some sort of order and coherence into the pattern of attitudes, evaluations or, if you please, the values by which he lives. And society also finds it necessary to try to maintain a certain degree of coherence in these attitude systems.

It seems to us that many of the contributions to humane values which history, philosophy, literature and the drama each can make aid the development of these systems of attitudes and evaluations within the individual. Both the individual and a society manifest constant development of new attitudes and new evaluations, and at the same time there is the ever-present need of organizing them into coherent patterns of the old and the new. Such factors as technological development alone force changes in attitudes which create imbalance in the individual and thus make necessary a continuous process of reorganization. It is, in our opinion, in terms of some such process as this that the greatest usefulness of the humanities lies.

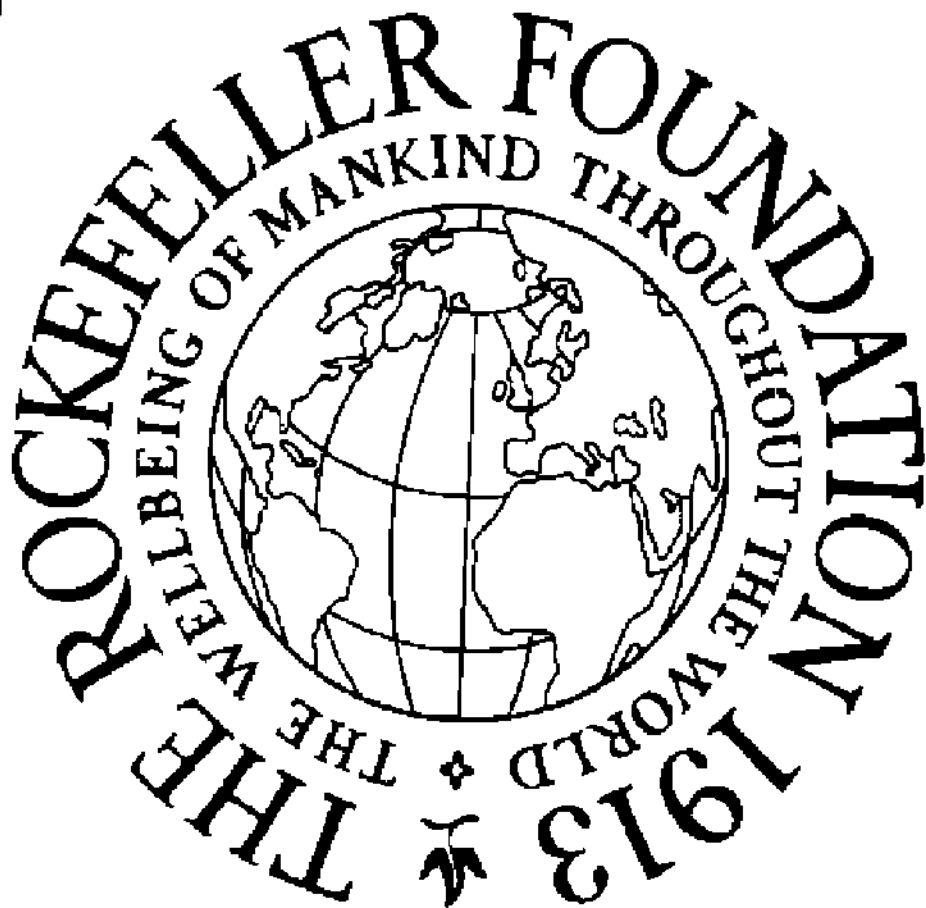
Perhaps it will aid understanding to restate in a brief recapitulation the plan of our program in the humanities. The first heading, on Language, Logic and Symbolism, is analytical and scientific in character; when the work is effective, it contributes to fundamental knowledge. The second part of the program, on Intercultural Understanding, is a contribution to operational knowledge; it is a practical working program, and most of the results that are produced will contribute to the sort of working knowledge that we need to live from day to day in our

international relations. But when we reach the third part of the program, the emphasis is no longer on knowledge, but on the contribution that is needed and that may be made to the processes by which our attitudes, beliefs and value judgments are developed, made more coherent and integrated into a harmonious pattern.

Now it seems to us that if these processes are to be kept healthy in a free society, there are three conditions that need to be served. First, it is important that the society have *creative effort* which is really producing, developing new ideas and putting them into understandable form. The next essential is *criticism*, which may be many things, but basically and perhaps most importantly is a sort of self-regulating mechanism in society that helps to keep the creative workers operating on constructive lines and not going off on tangents and turning out unintelligible work. The final requisite may be called *experience*, for want of a more descriptive term. It is expressed by the question: Granted that this work is being done, how does the public get access to it? In terms of scholarship, how can work in the humanities be brought from the level at which the professors can understand it to the level at which others can understand it? This poses problems of interpretation, of popular writing, of survey courses and of other techniques of general education.

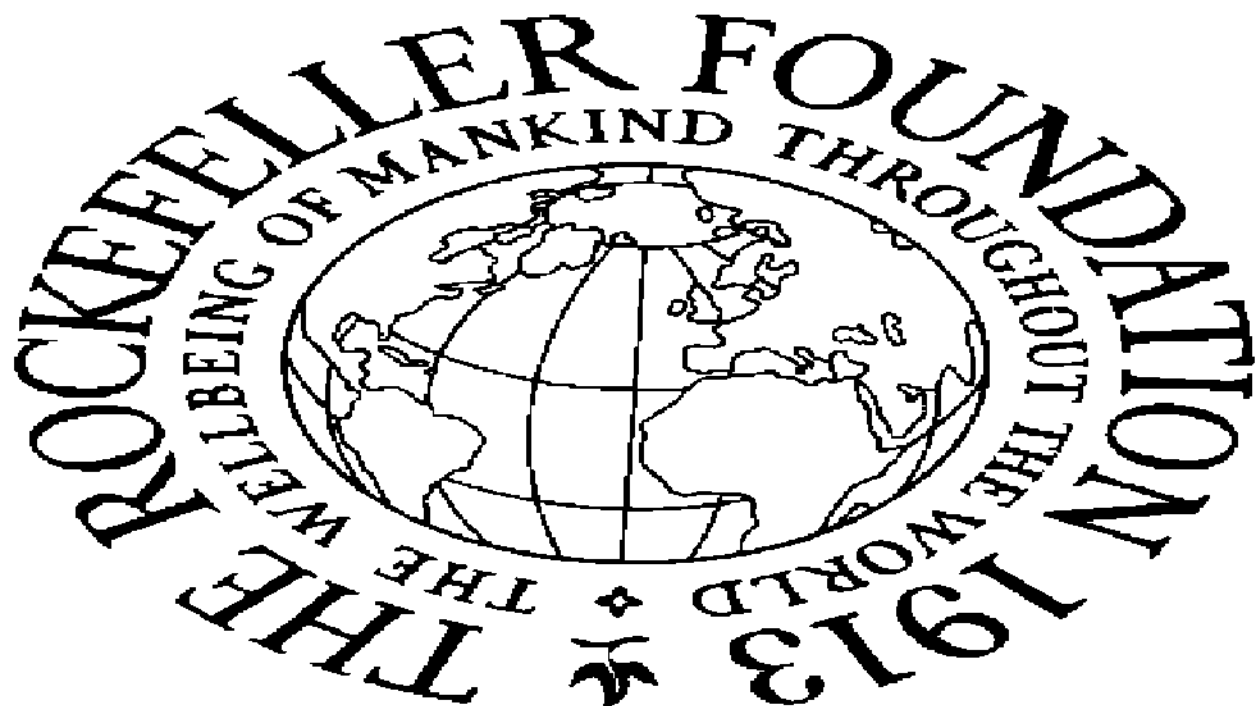
Several history-writing projects, which are currently active under Foundation grants, provide examples of creative work such as I have described.

A professor of anatomy
instructs three lawyers
who are enrolled in the
Law-Science Program
at Tulane University,
New Orleans



Photograph Excised Here

A lecture on economic
history of the United
States at the America
Institute, University of
Cologne, Germany



Photograph Excised Here

Under a program of
playwright studies f



Photograph Excised Here

One on the process of history in the twentieth century is being written by Professor Ralph Turner at Yale University. Another is Professor Edward D. Myers' work at Washington and Lee University in preparation of an atlas and gazetteer to accompany Toynbee's *A Study of History*, which is in addition to assistance given Dr. Toynbee himself. Then there are two projects being sponsored by the Pan American Institute of Geography and History: a comprehensive history of the Americas and, separately, a history of ideas in the Americas since 1875. All these undertakings are concerned with history in the large, which oversteps national boundaries and attempts to integrate the past of many different peoples — an aspect of history that seems especially important in the present stage of human affairs.

The Foundation is also fostering research and writing in modern history, both national and international. Two current undertakings in this field are supported by grants to the Colegio de México, for work on the modern history of Mexico, and to the Pan American Institute of Geography and History, for work on the modern history of Peru. Dr. Daniel Cosío Villegas, of the colegio, is writing the study of Mexico, covering the period from 1867 to 1910. Dr. Jorge Basadre, of the University of San Marcos in Lima, is writing the story of nineteenth century Peru.

A number of efforts to stimulate dramatic writing are active. One is the work of the New Dramatists Committee, Inc., New York, which has developed an apprentice system for the training of playwrights,

giving them contact with plays at various stages of production, providing opportunities for conferences with authors and in other ways affording promising new playwrights the workshop contacts and experiences which are so helpful in gaining skill in this difficult field of writing. The committee is made up of prominent dramatists, producers and others active in the professional theater, and in 1951 the Foundation appropriated \$47,500 toward support of its work for three years.

Experimental grants in aid were made to a number of university and community theaters, such as the Wisconsin Idea Theatre in Madison, the Karamu House in Cleveland and Margo Jones's theater in Dallas, to enable these organizations to appoint talented young people as playwrights-in-residence. This gives the writer close association with a producing organization and at the same time provides the organization with the full-time services of a writer — a reciprocal arrangement which may yield good results.

FREEDOM OF THE PRESS

A significant development in furtherance of humane values was the organization last year of the International Press Institute, with the immediate objective of advancing and safeguarding the freedom of the press throughout the world. The institute is also interested in the improvement of journalistic practices, the exchange of accurate and balanced

news among nations and in promoting mutual understanding among editors and thus among peoples. The institute is an outgrowth of a visit to the United States in 1950 of a group of editors from 14 countries, representing Europe, Latin America, Asia and Australia, which met here at the invitation of the American Press Institute and the American Society of Newspaper Editors. The International Press Institute was formally organized at a meeting in Paris in May of 1951, and Zurich, Switzerland, was chosen as headquarters. The Foundation's grant of \$120,000 is toward operating expenses for three years.

The total number of projects in all areas assisted through the Division of Humanities was 123 in 1950, with grants totaling \$1,491,250, and 134 in 1951, with grants totaling \$1,658,072, making a grand total of \$3,149,322 for the biennium.

MR. FOSDICK'S HISTORY

An important undertaking which reached its culmination last year was the writing of the history of the Foundation by Mr. Raymond B. Fosdick. This is a project that was approved by the Trustees in 1948. Indeed, as far back as 1938 a research worker was assigned the task of sifting through the files and abstracting data to serve as source material for the history. But it was felt that no one else was as well qualified as Mr. Fosdick to write the history, both because of his long association with and participation in the Rockefeller boards and his

personal acquaintance with the founder and with those who assisted in the original conception, and because of his literary skill and artistry as a writer. And so, while the records were being searched for pertinent information, a full decade passed until Mr. Fosdick reached the end of his term as President of the Foundation in the summer of 1948. Then he was free to devote full time to history writing. The manuscript was completed in the early months of 1951, and the book was recently published by Harper and Brothers under the title, *The Story of The Rockefeller Foundation*. It is not only an authentic account of the nearly 40 years of Foundation activities, but also treats of significant relationships with The Rockefeller Institute for Medical Research, the General Education Board, the International Education Board and the Laura Spelman Rockefeller Memorial. Publication at this time of transition seems especially opportune. The publisher has arranged with a London firm to bring out a British edition.

APPLICATIONS DECLINED DURING 1951 *

The Foundation, as may be expected, receives many more applications for aid than it can grant. During 1951 it was found necessary to decline 3,149 applications. Some of these applications represented projects within the Foundation's fields of interest, which were declined because other projects seemed more promising, or for various other reasons; but

* A list of applications declined during 1950 was published in the Annual Report of The Rockefeller Foundation for that year.

by far the greater number of these applications were declined because they were outside the program upon which the Foundation is at present concentrating.

The Foundation does not make gifts or loans to individuals, finance patents or altruistic movements involving private profit, contribute to the building or maintenance of local hospitals, churches, schools, libraries or welfare agencies, subsidize cures or inventions, or support campaigns to influence public opinion.

Aside from the 973 applications for fellowships, scholarships and travel and training grants, which always form a large proportion of applications declined, the next largest number declined was 618 for support of scientific research projects and teaching programs. This is a larger number than usual in this category and reflects the increasing interest everywhere in scientific research.

The general headings under which the 3,149 applications may be described are as follows: fellowships, scholarships and travel and training grants, 973; support of scientific research projects and teaching programs, 618; support (including buildings and endowments) of institutions of purely local character, for example, hospitals, churches, schools and museums, 340; general development of educational and cultural institutions, projects and materials, 306; personal aid to individuals, 183; publication of miscellaneous manuscripts, 105; studies and activities in the creative arts, 94; cures, remedies, investigation of

theories and inventions, 65; charitable agencies or programs, 48; conferences and meetings, 38; continued aid to previously supported projects, 25; purchase or disposal of real and personal property, 22; public health projects, 20; assistance to displaced persons, 11; miscellaneous, 301.

ORGANIZATION CHANGES IN 1951 *

Reorganization of the International Health Division and the Medical Sciences division in 1951 to form a new Division of Medicine and Public Health was reported by the President in the Foreword to the Annual Report of The Rockefeller Foundation for 1950 and is further discussed on page 17 of this Review. Dr. Andrew J. Warren, former Associate Director of the International Health Division, became Director of the new division on June 1, 1951. The other officers and staff members of the former two divisions now serve in the Division of Medicine and Public Health.

The 1950 Foreword also reported the retirement, in accordance with the age-retirement rule, of Dr. George K. Strode, Director of the former International Health Division, as of May 31, 1951; and the appointment as of May 1, 1951, of Dr. Alan Gregg, Director of the former Medical Sciences, as Vice-President of the Foundation.

On December 5, 1951 the division of Natural Sciences was renamed to indicate the Foundation's

* Organization changes in 1950 were published in the Annual Report of The Rockefeller Foundation for that year.

increased interest in agriculture so that it is now called the Division of Natural Sciences and Agriculture. The Advisory Committee for Agricultural Activities was replaced by the Board of Consultants for Agriculture on April 2, 1952, with Mr. E. C. Stakman as Chairman. There was no change in membership. On the same date the Board of Scientific Consultants for the Division of Medicine and Public Health was renamed the Board of Consultants for Medicine and Public Health.

Mr. Winthrop W. Aldrich retired from the Board of Trustees and as Chairman of the Finance Committee on June 30, 1951. Mr. Geoffrey S. Smith was elected to replace Mr. Aldrich as Chairman of the Finance Committee. Mr. Wallace K. Harrison, a member of the firm of Harrison and Abramovitz, architects, was elected a Trustee to fill the vacancy left by Mr. Aldrich. Mr. Douglas S. Freeman retired as Trustee on December 5, 1951. Both retirements were due to the Foundation's age-retirement regulation.

Mr. Dean Rusk, at that time Assistant Secretary of State for Far Eastern Affairs, was invited on December 5, 1951 to become President of The Rockefeller Foundation. He served in the capacity of Assistant to the President of the Foundation from March 4, 1952 and assumed the office of President on July 1, 1952. Mr. Chester I. Barnard retired from the presidency on June 30, 1952, having reached the retirement age. Mr. Barnard had been serving concurrently as Chairman of the National Science Foundation since December 1951.

Dr. Hugh H. Smith, Assistant Director of the Division of Medicine and Public Health, was appointed Associate Director on September 28, 1951. Dr. John B. Grant, a member of the staff of the division, was appointed Associate Director; and Dr. Marshall C. Balfour and Miss Elizabeth W. Brackett, members of the staff, were appointed Assistant Directors of the division on December 5, 1951.

Dr. Henry W. Kumm, who joined the staff of the former International Health Division in April 1927, resigned as of July 9, 1951 from the Division of Medicine and Public Health, into which the International Health Division had been merged, to become Assistant Director of Medical Research of the National Foundation for Infantile Paralysis, New York City. Dr. Kumm's work with the International Health Division was chiefly in yellow fever investigation and control. He conducted studies, control work and surveys in Nigeria, Brazil, Colombia and Central America. He also worked for nearly two years in Jamaica on the study and control of yaws and did research and field work in malaria at the New York laboratories and in Central America. He served as the International Health Division's representative in Rio de Janeiro, Brazil, for about four and a half years.

Miss Anna Mary Noll joined the staff of the former International Health Division October 1, 1947 and was attached to the Foundation's office in India, where she was the staff member responsible for the nursing program in the Far Eastern area. She resigned as of March 31, 1951 to take a position in the United States.

Mr. J. G. Harrar, formerly Field Director for Agriculture, became Deputy Director for Agriculture in the Division of Natural Sciences and Agriculture, and Mr. E. J. Wellhausen, formerly geneticist of the Mexican Agricultural Program, became Local Director of that program on December 5, 1951.

Mr. William F. Loomis resigned as Assistant Director of the Division of Natural Sciences and Agriculture on December 31, 1951. He continues his association with the division as Consultant.

Three new members were added to the staff of the agricultural program of the Division of Natural Sciences. Dr. John W. Gibler, formerly of the Department of Plant Pathology, and Dr. Ralph W. Richardson, Jr., formerly of the Department of Horticulture, University Farm, University of Minnesota, St. Paul, were appointed assistant plant pathologist and assistant geneticist, respectively, in the Mexican Agricultural Program. Dr. Ulysses J. Grant, formerly of the New York State College of Agriculture at Cornell University, was appointed assistant geneticist with the Colombian Agricultural Program.

Mr. Frederic C. Lane joined the staff of the Foundation on July 1, 1951 as Assistant Director of the Division of Social Sciences. Mr. Lane came to the Foundation from the Johns Hopkins University, where he has been professor of history since 1946.

Mr. Philip E. Mosely resigned as Assistant Director in the Division of Social Sciences on June 30, 1951. His association with the Foundation had been of a part-time nature, as he was simultaneously connected with the Russian Institute at Columbia University

of which he is director. Mr. Mosely served as Consultant to the Division of Social Sciences in 1946 and 1947 and became Assistant Director in 1948. During 1952 he will continue to serve as Consultant to the division, as he has since July 1951.

Mr. Robert Letort of the Paris office was appointed June 22, 1951 as Assistant Comptroller of the Foundation.

REPORT OF THE SECRETARY

SECRETARY'S REPORT

THE Members and Trustees of The Rockefeller Foundation during the year 1951 were:

JOHN FOSTER DULLES, *Chairman*

WINTHROP W. ALDRICH ¹	ROBERT F. LOEB, M.D.
CHESTER I. BARNARD	ROBERT A. LOVETT
WILLIAM H. CLAFLIN, JR.	HENRY ALLEN MOE
KARL T. COMPTON	WILLIAM I. MYERS
JOHN S. DICKEY	THOMAS PARRAN, M.D.
HAROLD W. DODDS	JOHN D. ROCKEFELLER, 3RD
LEWIS W. DOUGLAS	DEAN RUSK
DOUGLAS S. FREEMAN ²	GEOFFREY S. SMITH
HERBERT S. GASSER, M.D.	ROBERT G. SPROUL
WALLACE K. HARRISON ³	ARTHUR HAYS SULZBERGER
HENRY P. VAN DUSEN	

The officers of the Foundation were:

JOHN FOSTER DULLES, *Chairman of the Board of Trustees*
CHESTER I. BARNARD, *President*
DEAN RUSK, *President-Elect*⁴
ALAN GREGG, M.D., *Vice-President*⁵
LINDSLEY F. KIMBALL, *Vice-President*
FLORA M. RHIND, *Secretary*
EDWARD ROBINSON, *Treasurer*
GEORGE J. BEAL, *Comptroller*
GEORGE K. STRODE, M.D., *Director for the Division of Medicine and Public Health*⁶
ANDREW J. WARREN, M.D., *Director for the Division of Medicine and Public Health*⁷
WARREN WEAVER, *Director for the Division of Natural Sciences and Agriculture*
JOSEPH H. WILLITS, *Director for the Division of Social Sciences*
CHARLES B. FAHS, *Director for the Division of Humanities*

¹ Retired June 30, 1951.

² Retired December 5, 1951.

³ Effective July 1, 1951.

⁴ Effective December 5, 1951.

⁵ Effective May 1, 1951.

⁶ Retired May 31, 1951.

⁷ Effective June 1, 1951.

The Foundation's counsel were Chauncey Belknap and Vanderbilt Webb. Dr. Herbert S. Gasser served as a Committee on Audit for the year 1951.

The following were members of the Executive Committee during the year:

THE PRESIDENT, *Chairman*

HAROLD W. DODDS	HERBERT S. GASSER, M.D., <i>alternate member</i> ¹
JOHN FOSTER DULLES	
ROBERT F. LOEB, M.D.	WALLACE K. HARRISON, <i>alternate member</i> ²
HENRY ALLEN MOE	
JOHN D. ROCKEFELLER, 3RD	HENRY P. VAN DUSEN, <i>alternate member</i>
GEOFFREY S. SMITH	

The following served as members of a Board of Scientific Consultants for the Division of Medicine and Public Health of the Foundation during 1951:

DEAN A. CLARK, M.D.	KENNETH F. MAXCY, M.D.
GORDON M. FAIR	HUGH J. MORGAN, M.D.
WILTON L. HALVERSON, M.D.	THOMAS PARRAN, M.D.

The following served as members of an Advisory Committee for Agricultural Activities during 1951:

	E. C. STAKMAN, <i>Chairman</i>
RICHARD BRADFIELD	P. C. MANGELSDORF

MEETINGS

During 1951 regular meetings of The Rockefeller Foundation were held on April 4 and December 4 and 5; a special meeting was held on September 28. Five meetings of the Executive Committee were held in 1951 to take actions within general policies approved by the Trustees.

¹ Until June 30, 1951.

² Effective July 1, 1951.

FINANCIAL STATEMENT

A summary of the Appropriations Account of the Foundation for the year 1951 and a statement of its Principal Fund follow:

SUMMARY OF APPROPRIATIONS ACCOUNT

FUNDS AVAILABLE		FUNDS APPROPRIATED	
Balance from 1950	\$10,643,614	Appropriations	
Income for 1951...	16,972,914	Medicine and Public Health	\$3,796,270
Unexpended balances of appropriations allowed to lapse and refunds on prior year grants....	1,545,846	Natural Sciences and Agriculture....	3,680,208
		Social Sciences.	4,586,895
		Humanities....	1,658,072
		General Education Board...	5,001,625
		Miscellaneous..	680,526
		Administration	
		Scientific Divisions.....	1,108,291
		General.....	646,993
			<hr/>
			\$21,158,880
		Balance available for appropriation in 1952....	8,003,494
			<hr/>
	<hr/>		<hr/>
	\$29,162,374		\$29,162,374
	<hr/>		<hr/>

PRINCIPAL FUND

Book value, December 31, 1950.....		\$118,735,747
Amount by which the proceeds of securities sold during 1951 exceeded the ledger value.....	\$10,209,256	
Excess of quoted market value over cost of securities donated to General Education Board.....	2,534,907	
Gift from anonymous donor.....	12,000	12,756,163
	<hr/>	<hr/>
Book value, December 31, 1951.....		\$131,491,910
		<hr/>

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**DIVISION OF MEDICINE
AND PUBLIC HEALTH**

DIVISION OF MEDICINE AND PUBLIC HEALTH¹

1951

BOARD OF SCIENTIFIC CONSULTANTS

DEAN A. CLARK, M.D.	KENNETH F. MAXCY, M.D.
GORDON M. FAIR	HUGH J. MORGAN, M.D.
WILTON L. HALVERSON, M.D.	THOMAS PARRAN, M.D.

OFFICERS

Director

GEORGE K. STRODE, M.D.²
ANDREW J. WARREN, M.D.³

Associate Directors

JOHN B. GRANT, M.D.⁴
ROBERT S. MORISON, M.D.⁵
WADE W. OLIVER, M.D.⁵
HUGH H. SMITH, M.D.⁶
R. R. STRUTHERS, M.D.⁵

Assistant Directors

MARSHALL C. BALFOUR, M.D.⁴
ELIZABETH W. BRACKETT⁴
GEORGE C. PAYNE, M.D.⁷
MARY ELIZABETH TENNANT⁷

STAFF

THOMAS H. G. AITKEN, Ph.D. ⁸	RICHMOND K. ANDERSON,
CHARLES R. ANDERSON, M.D.	M.D., Ph.D.

¹ International Health Division and Office of Director for the Medical Sciences discontinued as of April 30, 1951; Division of Medicine and Public Health created May 1, 1951.

² Director of International Health Division through April 30, 1951; Director of new Division May 1-31; retired May 31.

³ Associate Director of International Health Division, January 1-April 30, 1951; Acting Director of new Division May 1-31; and Director effective June 1.

⁴ Effective December 5, 1951; staff member of new Division May 1-December 4 and of International Health Division January 1-April 30.

⁵ Of Medical Sciences and succeeding Division of Medicine and Public Health.

⁶ Effective September 28, 1951; Assistant Director of new Division May 1-September 27 and of International Health Division January 1-April 30.

⁷ Of International Health Division and succeeding Division of Medicine and Public Health.

⁸ On study leave, Johns Hopkins School of Hygiene and Public Health academic year 1951-1952.

MARSTON BATES, Ph.D.	FREDERICK W. KNIFE
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DIVISION OF MEDICINE AND PUBLIC HEALTH

THE world today contains many agencies, both private and governmental, dedicated to the advancement of the welfare of mankind. This does not mean that the field is overcrowded, but it does mean that each such agency must give careful thought to examining its program in relation to the programs and activities of all the others, thereby adding a complication to decisions at the level of strategy that was not present when the work of the medical divisions of The Rockefeller Foundation was first started. It places a particular responsibility on The Rockefeller Foundation because in the past so many of its activities have been pioneering, establishing patterns that have now come to be accepted and supported by many other agencies. The particular advantage of The Rockefeller Foundation is flexibility. It does not have to adopt a cut-and-dried program with an elegant balance of internal consistency and external plausibility. It is free to continue the pioneering tradition, involving the testing of patterns of action and thought not yet widely recognized or accepted.

This basic philosophy made possible the fusion of two former entities of the Foundation, the Medical Sciences division and the International Health Division. The merger was a recognition by the Trustees of the essential interdependence of the functions of these divisions in fostering education, research and application in the broad general field of medicine and health. The union was not the mere consolidation of staffs and programs, but the achievement of a framework that would permit the development of a new orientation of program through which the interrelations of the various kinds of medical problems would find adequate expression. It is recognized that such a reorientation of program should be a gradual process — an evolutionary growth rather than a drastic experiment in surgical grafting. The program of the new Division of Medicine and Public Health should emerge from a combination of the most pertinent elements of the older programs.

Public health is recognized and accepted as a function of the state. The greatest handicap of government in utilizing available knowledge often is not the lack of funds, but the lack of competent professional personnel. The whole progress of public health therefore depends to a very great degree on the progress of professional education. The development of curative and preventive medicine waxes and wanes with the quality and quantity of the medical and nursing professions. The skeleton personnel of the usual health department can never, alone, solve the problems of public health and preventive medicine. Under a free enterprise system

their solution must involve the private practitioners of medicine. Any other solution is out of the question because of the numbers of trained persons required, the financial outlay that would be necessary and the diffuse and all-pervading nature of the problem.

Change is essential for any organization that hopes to remain adapted to the needs of a changing world. Shift in emphasis and new departures are in no sense a criticism of past policies which have been carried to a point where reorientation is possible. The objective is to develop a program that is devoted to the clarification of basic principles rather than to the demonstration of finished technologies that are applicable only in the economic and cultural context in which they were developed.

The new division will function as both an operating and a disbursing agency. The International Health Division carried out its work by means of a professional staff resident in many parts of the world. This method of operation has proved effective, and the Division of Medicine and Public Health plans to continue it. Often the Foundation's contributions in staff services have been more valuable than its contributions in dollars.

In past years the work of the International Health Division has been reported briefly in a section of the Annual Report of The Rockefeller Foundation and in more extended form in a separately published International Health Division report. This separate report has now been discontinued; instead, a single account of the work of the new combined division is given in the Annual Report.

An extended account of the history of the re-organization and the new principles and programs which it has brought about has been given in pages 14 to 18 of the present Annual Report as a section of the President's Review. The pages that follow will give details on the grants made during 1951, as well as some account of the papers published by the staff and of the field work still under way in various parts of the world.

This report, as to subject matter, follows the outline set forth in the President's Review, subdividing the activities under the four heads of professional education, medical care, investigation and control of diseases and development of the health sciences. There will also be brief accounts of small appropriations and grants in aid.

The amounts spent under these headings in 1951 were professional education \$201,250; medical care \$185,358; investigation and control of diseases \$375,248; and promotion of the health sciences \$1,093,070. In addition, \$555,000 went to fellowship programs; \$600,000 to a sum to be allocated for grants in aid, \$400,000 of which was for 1952; and \$736,344 to the field staff budget for 1952.

Countries in which one or more staff members were maintained in 1951 were England, France, Italy, Egypt, India, Iran, Japan, Canada, Bolivia, Brazil, Chile, Colombia, the Dominican Republic, Mexico and Peru. These staff members acted as consultants and administrators of Foundation cooperation in such fields as sanitary engineering, nursing, public health education, government health services,

experimental health units and epidemic disease control.

PROFESSIONAL EDUCATION

UNIVERSITY OF COLORADO

Conference on the Teaching of Public Health and Preventive Medicine

There is a great need for professional workers in the fields of public health and preventive medicine, yet relatively few medical students elect to follow careers in such fields. One line of attack on this problem might be through changes and improvements in undergraduate medical education. Effective teaching in the health and preventive fields would make future practicing physicians more aware of the problems and requirements of these aspects of medicine and might influence more students to elect to specialize in such work.

A large conference of professors of public health and preventive medicine was held in 1946 at the University of Michigan to discuss these problems. This conference was aided by a grant from The Rockefeller Foundation. The method of conference discussion proved to be stimulating and effective. Consequently, plans have been started for a second conference which could continue discussion in the light of the changes in problems and personnel that have taken place during the last five years. A committee under Dr. Lloyd Florio, of the School of Medicine of the University of Colorado, was formed to draw up plans for such a conference. The Rockefeller Foundation in

1951 appropriated \$15,000 toward the costs of this project, and the University of Colorado has accepted responsibility for administering the Foundation grant.

The planning committee hopes that the conference will serve to clarify the kinds of relationships that should exist between undergraduate, graduate and postgraduate training in preventive medicine and public health and that it will define the responsibilities of the special departments for undergraduate teaching, taking into consideration problems of curriculum and teaching method.

The conference will be held in the fall of 1952, and plans are being made for attendance by about 100 representatives of schools and departments of public health and preventive medicine.

MEDICAL LIBRARY ASSOCIATION

Fellowships

The sum of \$30,000 was appropriated to the Medical Library Association for its use over a three-year period in financing fellowships for medical librarians from abroad. This association has done much to define proper medical library procedure and to advance techniques for effective utilization of medical literature, especially in the United States. Recently it has extended some of its services to libraries in other countries where development of modern medical research and teaching is being held up for want of adequate distribution of scientific literature.

Two years ago, with assistance from the Foundation, the association established an experimental

fellowship program, under which two librarians from Chile, two from Austria, one from Uruguay, one from Northern Ireland and one from India spent a year in the United States studying and observing the latest library methods. Medical librarians and general library schools cooperated enthusiastically with the association in setting up programs of study tailored to the needs of individual visitors. Continuation of this fellowship program will enable three or four more persons a year to acquire the skills upon which depend the success of many other private, public and international efforts to meet the literature needs of foreign scientists.

CORNELL UNIVERSITY

Statistical Service

The Department of Public Health and Preventive Medicine of Cornell University Medical College has recently organized a program that aims to improve statistical teaching and service in all departments of the medical college. At present there are statisticians in several departments of the medical college. Under the new plan, the work of all of these will be coordinated by a statistical consultant, who will be a member of the Department of Public Health and Preventive Medicine — a logical hub for statistical services because of its experience with the quantitative aspects of disease. The statistical consultant will teach the elements of statistics to medical students and give seminar courses for interns, residents and younger staff members engaged in research. He will cooperate with research workers in all departments

in the formulation of their problems and the evaluation of their results.

By this means, it is hoped that statistical concepts will diffuse widely through the medical college. Quantitative methods are becoming increasingly important in all aspects of medicine, yet medical students receive little training in statistical methods and research workers are often naive in their handling of numerical data. The Cornell experiment thus has wide implications in relation to medical teaching and research.

The Rockefeller Foundation contributed to the establishment of this program in 1951 with a five-year appropriation of \$30,000, to be applied toward the cost of the consultant's salary, secretarial aid and office supplies.

NATIONAL LEAGUE OF NURSING EDUCATION

Accrediting Program

In order to carry out a coordinated attack on the most pressing problems in nursing today, the six national United States nursing organizations in 1948 joined forces to establish the National Committee for the Improvement of Nursing Services. This committee was aided by The Rockefeller Foundation in 1949 through a small grant to the National League of Nursing Education. Further assistance was provided in 1951 by means of an additional appropriation of \$65,000.

Recognizing that better nursing education is essential to better nursing service, the committee in 1949 conducted a questionnaire survey of practices

in basic schools of nursing throughout the country. The results of the study, which have been published under the title *Nursing Schools at the Mid-Century*, showed that standards for the education of nurses exhibit a wide variation, with only 25 per cent of the 1,193 schools that answered the questionnaire meeting or approaching standards set by the profession in 1937. The survey also indicated a serious shortage of qualified nurse-instructors throughout the country.

Several steps have already been taken toward raising the level of education for nurses. Prominent among these is the program of the National Nursing Accrediting Service, for which the current Rockefeller Foundation grant was made. This service, formed in January 1949 through the merger of four agencies previously engaged in accrediting work, has recently embarked upon an intensive five-year plan. Basically, the plan is designed to bring about the accreditation, under a nation-wide, unified system, of every nursing school capable of measuring up to the agreed standards; the Accrediting Service will furnish advice and counsel to assist the schools in reaching the mark within the time schedule. The plan includes a professional visit to each school applying for accreditation and the holding of regional conferences for nurse-educators.

The accreditation program is expected to spark the improvement of some schools and the reorganization of others; it will also probably lead to the discontinuation of a number of training programs. At the end of the five-year period the Accrediting Service will have carried out two complete screenings

of United States nursing schools, aimed at identifying the institutions of high standing and pointing out the weak spots in the nursing educational system. The Foundation's grant, available through the middle of 1952, was made to help initiate on an adequate footing this important attempt to promote the healthy growth and advancement of the nursing profession.

THE JOHNS HOPKINS UNIVERSITY

Institute of the History of Medicine

The Institute of the History of Medicine at the Johns Hopkins University was founded in 1929 with the aid of an appropriation from the General Education Board. In the intervening years the institute has become a distinctive and important feature of medical education at the university. The study of medical history provides a mechanism for relating the practice and knowledge of medicine to the fabric of society as a whole, giving the student a perspective that is otherwise all too easily lost in the mass of detail of technical training. This general broadening and integrating effect of historical study has been particularly stressed by the staff of the Hopkins institute.

The staff of the institute give courses in several departments and schools of the university, including the Schools of Medicine, Hygiene and Public Health, and Higher Studies. Plans for the near future include a program for training graduate students in the history of both medicine and the natural sciences and a program for research in medical economics, the latter to be carried out in cooperation with the

Department of Political Economy. The Rockefeller Foundation has been assisting the work of the institute since 1935. A 1951 grant of \$30,000 covers forward financing through June 1954 at the current rate of support of \$30,000 per year.

YALE UNIVERSITY

History of Medicine

A three-year grant of \$15,000 was made by The Rockefeller Foundation in 1951 for work in the history of medicine by Dr. Henry E. Sigerist. From 1932 to 1947 Dr. Sigerist directed the Institute of the History of Medicine at the Johns Hopkins University. He resigned this post in order to devote himself exclusively to the task of writing a comprehensive history of medicine, based on material he had systematically collected and prepared over a span of many years.

Dr. Sigerist has always been particularly interested in the social aspects and implications of the biological and medical sciences. His work has consistently stressed the importance of the social and cultural setting in which medical knowledge and medical practice have developed. The history he is currently writing is planned for eight volumes. The first of these, dealing with primitive and archaic medicine, was published in 1951 by the Oxford University Press and was enthusiastically received by both medical and lay historians.

Since his retirement from Johns Hopkins, Dr. Sigerist has held the position of nonresident research associate with professorial rank at Yale University,

which has agreed to accept and administer the present Foundation grant.

MEDICAL CARE

FAMILY HEALTH CARE

Personnel Requirements

The widening scope of welfare legislation has provoked much thoughtful inquiry on the subject of how to implement the medical care and social welfare objectives set forth by the new laws. A major problem confronting administrators in all countries concerns the personnel required to take care of the basic health and welfare needs of the family. Can one type of worker with proper training in the various branches of health and social welfare adequately meet these needs, or are several categories of workers necessary? In 1950 The Rockefeller Foundation set aside \$16,700 toward the expenses of a study of this problem in collaboration with the World Health Organization; an additional sum of \$30,358, available through the end of 1953, was appropriated in 1951.

The preliminary task of planning and organizing the work has now been completed, and the investigation is currently under way in both France and England, the two countries selected as study areas. The specific aims of the project are:

- 1) To study the work now performed by all types of social and health workers in order to define its scope, nature and actual content
- 2) To ascertain the knowledge required and the criteria employed in the advisory and analytical phases of this type of work

- 3) To examine the relevance of the training of social and health workers to the functions they actually perform and to the technical skills and knowledge their work demands
- 4) To determine the extent to which functions carried out by the social and health worker meet the full range of family health and welfare needs

The director of the study is Dr. René Sand, formerly professor of social medicine at the University of Brussels. A technical advisory committee composed of French and British experts in social research, statistics, public health administration, nursing and social work meets regularly with him to guide the study and assist with the evaluation of the results. In addition, a technical panel has been set up to provide the research staff in the field with consultation service on problems of methodology and procedure throughout the course of the investigation and during the preparation of the report.

In Great Britain this study is being undertaken in the Department of Human Ecology at the University of Cambridge, under the direction of Professor Leslie Banks. Preliminary work began in Bedfordshire and its central market town, Luton, in October. The first objective of the study is to identify the organizations, official and nonofficial, that work with families and the programs which these groups are prepared to carry out.

In the first six weeks, 70 organizations were found in this single county, all of which provide health or welfare services for families. On the basis of the findings and the techniques worked out in Bedfordshire, a number of areas throughout England will be

examined, so as to obtain representative data for the whole country.

HEALTH INSURANCE PLAN OF GREATER NEW YORK

Study of Its Experience

The Health Insurance Plan of Greater New York, launched in 1947 to develop and operate a voluntary health insurance program in the New York City area, is a private nonprofit group-membership corporation now reaching some 340,000 individuals. It has come to be the largest prepaid complete medical service in the United States, with a program resting on four major policies: family coverage for comprehensive care; prepayment by subscribers for physician and auxiliary services; group medical practice; and the payment of capitation or fixed fees by the corporation to medical groups as full compensation for the services they render to subscribers and their dependents.

Along with its medical care operations, the corporation has conducted a continuous program of statistical research. It has built up the largest body of statistics available anywhere on the sickness experience and medical needs of typical middle-class families, as indicated by the amount and kind of medical care these families consume when they face no economic barriers in asking for it. The history of both individuals and families can be traced during the period of health insurance because participating physicians are required to make detailed records of their services. These records are analyzed statistically

and a) classified by disease under treatment and b) linked by individuals and families within the insured populations to the participating medical groups and to the pertinent specialties within the groups.

Aided by appropriations from The Rockefeller Foundation and the Commonwealth Fund, the Health Insurance Plan has embarked on a study of its body of statistics and its experience. A committee of biostatistical experts has selected five areas to be covered by the investigation. These are: 1) the need for medical care, 2) the incidence of illness in families and its implication, 3) the effect of removal of economic barriers, 4) the preventive aspects of the plan and 5) its method of conducting clinical research. The intention is to explore these areas through an interview study of about 5,000 families insured under the plan and an equal number of families in the general New York City population, comparing the health conditions of the two groups and the medical services required by each group.

The Foundation has previously allocated a total of \$388,000 to the Health Insurance Plan toward the development and operation of the medical insurance program. The 1951 grant is \$155,000, which will be available until the end of 1954, the scheduled completion date for the study.

INVESTIGATION AND CONTROL OF SPECIFIC DISEASES AND DEFICIENCIES

The investigation and control of disease has been a time-honored occupation of the International Health Division. The new Division of Medicine and Public

Health is continuing this interest and giving special attention to viruses.

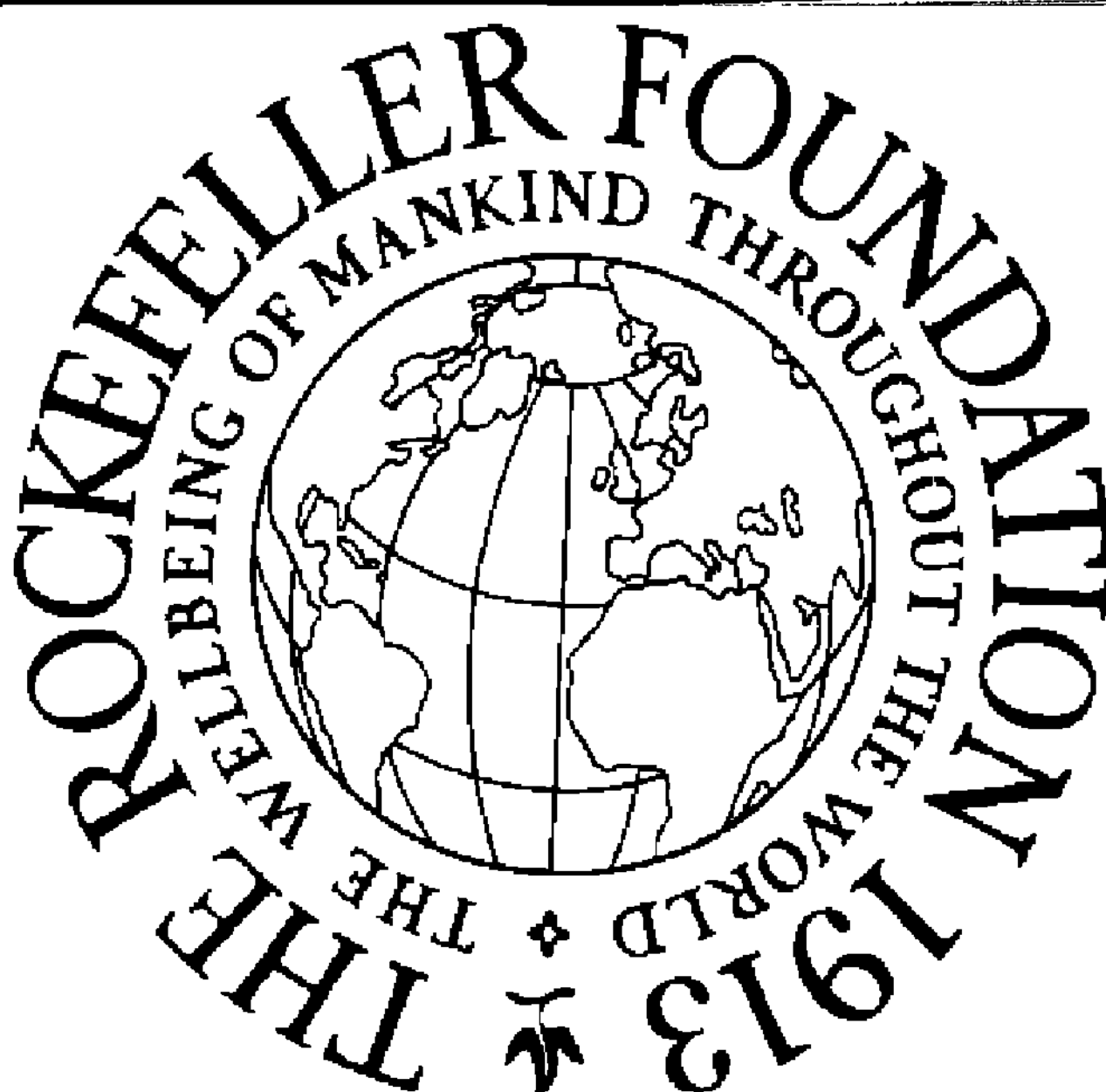
On page 23 of the President's Review, reference is made to Dr. Max Theiler, who has been with The Rockefeller Foundation since 1930, and who in 1951 received a Nobel Prize for his basic discoveries in connection with a successful yellow fever vaccine. In his formal lecture at Stockholm on December 11, 1951, as a Nobel Prize winner, Dr. Theiler gave a careful review of the scientific and highly technical discoveries in which he played a leading part. The conclusions are that many millions of potential yellow fever victims have been protected by vaccination, now a comparatively simple process, and that in all likelihood yellow fever will cease to be a public health menace.

Next to the winning of a Nobel Prize by a staff member of The Rockefeller Foundation, an outstanding event of the year was the publishing within the covers of a single volume of a history and summary of Foundation work in yellow fever. The editor-in-chief of *Yellow Fever* was Dr. George K. Strode, who retired as Director of the Division of Medicine and Public Health in 1951. Collaborating with him were eight colleagues and staff members.

VIRUS INVESTIGATIONS

LABORATORIES OF THE DIVISION OF MEDICINE AND PUBLIC HEALTH

In the interval between 1937 and 1948 a number of unidentified viruses were encountered by members



Photograph Excised Here

Field trip in connection with virus studies at the Walter and Eliza Hall
Institute of Medical Research, Melbourne, Australia





Taking a height measurement for the program in constitutional medicine at the University of Oregon Medical School

Photograph Excised Here

Asthma patients meet for group psychotherapy at the Wilhelmina Hospital, Amsterdam



Photograph Excised Here

of The Rockefeller Foundation staff and their colleagues during the course of a long-term investigation of yellow fever in Africa and South America. The virus of yellow fever, in fact, proved to be only one of a related series of viruses pathogenic for man and animals and transmitted by mosquitoes, ticks, mites and other biting arthropods. In Europe, North America and Asia, moreover, various similar viruses causing encephalitis have been discovered. The implication is that such agents may at times be important causes of disease, masked in the past by ignorance.

As the new agents were isolated, Foundation staff made certain basic investigations on them, but no systematic studies were possible until early in 1949. At that time a group of men at the New York laboratories of the International Health Division, most of whom had been intimately associated with the yellow fever program, undertook a comprehensive study of the viruses by means of immunological, physical and chemical methods. By the end of two years, intensive investigation had yielded important information on the immunological relationships of the new viruses. Some are related to well-known agents of human diseases, and others appear to be distinct entities which cause a number of unknown diseases. Several are already known to be widely distributed geographically.

On the basis of these preliminary studies, the newly reorganized Division of Medicine and Public Health has broadened its virus program to include studies of the distribution and epidemiology of

insect-borne virus diseases pathogenic for man and domestic animals. In addition to the new viruses, interest will focus on a large group of viruses that are known to be related.

It is the function of the Foundation's New York laboratories to carry out the exacting studies of the chemical and physical properties of the viruses and to make comparative studies of material collected in various parts of the world. The Foundation is now in process of establishing field investigation units in the important zoogeographical areas of the world. The first of these is located in Poona, a city in the hills about 120 miles from Bombay. Investigations are being carried out in active cooperation with the Indian Medical Research Council. A Foundation staff has been assigned to Cairo to undertake a survey of the major virus problems of Egypt, in cooperation with the United States Naval Medical Research Unit No. 3.

During 1951, the Foundation appropriated \$355,088 for virus research in New York, India, Egypt and any other countries in which it may be advisable to undertake field investigations. The major part of these funds is earmarked for use in 1952.

Epidemiology of Recently Discovered Viruses

In the table on page 131 are given the names and isolation history of the new viral agents. It is of interest that only three were isolated from human beings. All were discovered accidentally, so to speak, by virtue of the fact that the methods employed in the isolation of yellow fever virus are effective also for

other viral entities which are neurotropic for Swiss mice. This does not, of course, imply that the new agents are necessarily neurotropic in their natural hosts — whatever these may be. Nor does it mean that they attack man or, if so, with enough frequency to create a public health problem. It is possible that some of the viruses may play their leading roles as the causative agents of diseases of wild animals in Africa or South America. It is also possible that the geographic distribution of some of them may be so limited that, even though they attack human beings, they may be only of local importance.

Isolation History of Recently Discovered Viruses

VIRUS	COUNTRY OF ORIGIN	YEAR ISOLATED	No. STRAINS ISO-LATED	PROVED OR PRESUMED SOURCE			
				No. of strains isolated from			
				Man	Mos-quitoes	Mon-keys	Other wild animals
Bwamba fever	Uganda	1937	9	9	0	0	0
West Nile	Uganda	1937	1	1	0	0	0
Semliki Forest	Uganda	1942	1	0	1	0	0
Bunyamwera	Uganda	1943	1	0	1	0	0
Ntaya	Uganda	1943	1	0	1	0	0
Mengo	Uganda	1946-7	6	1	2	2	1
Zika	Uganda	1947-8	2	0	1	1	0
Uganda S	Uganda	1947	1	0	1	0	0
Kumba	Cameroons	1948	1	0	1	0	0
Anopheles A	Colombia	1940	1	0	1	0	0
Anopheles B	Colombia	1940	1	0	1	0	0
Wyomyia	Colombia	1940	1	0	1	0	0
Ilhéus	Brazil	1944	1	0	1	0	0
Leucocelaenus	Brazil	1945	1	0	1	0	0
Haemagogus A	Brazil	1946	1	0	1	0	0
Sabethes	Brazil	1946	1	0	1	0	0
Haemagogus B	Brazil	1946	1	0	1	0	0

Source: From Smithburn, K. C. "Studies on Certain Viruses Isolated in the Tropics of Africa and South America. Immunological Reactions as Determined by Cross-Neutralization Tests." *The Journal of Immunology*, Baltimore, 68:441-460 (April) 1952.

It is certain, however, that at least one of the agents has a very wide geographic distribution, although its importance to man is not yet clearly understood. The Mengo virus, known to be closely related to or identical with the encephalomyocarditis (EMC), MM and Columbia-SK viruses, is one of a group having a very wide range. Originally encountered in New York and designated the Columbia-SK and MM strains, and next isolated from a chimpanzee in Florida and designated the EMC virus, it was then shown to have been the etiologic agent of an outbreak of illness in American soldiers in the Philippines. Next it was encountered in Uganda, East Africa, and, being believed an unknown agent, was given still another name, Mengo virus. Finally, in 1951, a new continent was added to the known range of the virus when an apparently identical strain was isolated from a sick monkey in Colombia, South America. Although believed by some not to be commonly a human pathogen, it unquestionably does attack man on occasion. In a recent survey of 297 indigenous residents of Uganda and Tanganyika, 1 per cent showed evidence of past infection with Mengo virus.

Of the eight East African viruses, the Bwamba and West Nile, as well as the Mengo virus, were isolated from the blood of sick persons, and their etiological relationships to the respective illnesses were proved by the development of specific antibodies in the blood of each virus donor as a consequence of the illness. However, the remaining five viruses were isolated from wild mosquitoes (and in the case of Zika virus from a naturally infected monkey) and not from

human beings. The only other information concerning infections with these agents in human beings was derived from limited immunity surveys. In the course of these surveys, however, antibodies to most of the new viruses have been demonstrated in the blood of human beings. All eight of the East African viruses had attacked man at some time in the past; and in South America, although tests are not yet complete, several individuals immune to the Ilhéus virus have been found.

In one of the African surveys, testing of 1,428 human sera against West Nile virus indicated a broad geographic range and probably epidemic incidence of infection with this agent. Immunity to the West Nile virus is widely distributed in Central Africa. Past incidence of the disease has been high not only in the semiarid regions of the Anglo-Egyptian Sudan, but also in the tropical forests of the Belgian Congo. Workers from Yale University have recently discovered a very high immunity rate to West Nile virus in Egyptian villages near Cairo.

Tests of 313 sera from residents of Uganda against Semliki Forest virus showed 15 per cent of all the donors to be immune. A recent testing of 615 sera from residents of Uganda and Tanganyika against Bwamba fever virus showed that this agent attacks man very commonly, its range extending across equatorial Africa from the Atlantic to the Indian ocean.

In a survey just concluded, 297 sera from residents of Uganda and Tanganyika were tested for neutralizing antibody against each of the eight viruses. It

appears that Mengo virus does not commonly attack human beings in the localities sampled, but that Bwamba, Ntaya, Zika, Uganda S, West Nile, Bunyamwera and Semliki Forest viruses do attack human beings in widely separated localities in East Africa with greater or less frequency. None of these agents is limited in range to the local area in which it was encountered, and since the Ntaya, Zika, Uganda S, Bunyamwera and Semliki Forest viruses have never been recovered from human beings, it is obvious that they are the etiologic agents of unknown infections in human beings. The approximate order of prevalence of infection in human beings was as follows: Bwamba, Ntaya, Zika, Uganda S, West Nile, Bunyamwera and Semliki Forest.

It is probably highly significant that a considerable number (68) of the sera were protective against more than one virus. No evidence exists to indicate that antibody evoked by one of the viruses will lead to cross protection against another of the group tested. It is believed that the observed plural protection, especially involving Ntaya, Zika, Uganda S and West Nile viruses, is probably a manifestation of common epidemiological factors — perhaps transmission by similar, related or even identical vectors. Whatever the meaning of the plural immunity, it seems clear that infection with Bwamba virus is only casually related to infection with any of the others.

Immunological Relationships

In initiating studies of the new viruses, a primary concern of the New York staff was to classify them

into similar groups according to their immunological relationships. For this purpose series of both cross neutralization tests and cross complement fixation tests were run on the group of new viruses and on a dozen well-known viruses which affect the nervous system. The results of the two series of tests were compatible and in general agreement. One, the Kumba virus from the British Cameroons, was soon eliminated because it proved identical with, or simply another strain of, the Semliki Forest virus from Uganda. Two other major reciprocal cross reactions in the neutralization tests involved the Russian spring-summer encephalitis and louping ill viruses, and the Mengo and EMC viruses. In complement fixation tests, the Mengo virus gave a one-way cross with the FA and GD VII strains of mouse encephalomyelitis and four of the Brazilian viruses. This suggests that there may be some relationship between the encephalomyocarditis and encephalomyelitis groups of viruses.

These four Brazilian viruses — Haemagogus A, Haemagogus B, Sabethes and Leucocelaenus — are immunologically related to one another and are also related to, if not identical with, the virus of spontaneous encephalomyelitis in mice. This mouse virus is a poliomyelitis-like agent of apparently world-wide distribution. All four Brazilian viruses or virus strains behaved similarly in the developing chick embryo. It seems likely that they may have originated in the mice used in isolating and maintaining the viruses, rather than from wild mosquitoes, as was originally assumed.

Since the Kumba and the Semliki viruses are the same, the name Kumba virus disappears from the list and Semliki remains. The Mengo, Haemagogus A, Haemagogus B, Sabethes and Leucocelaenus viruses have been identified with other known viruses, and therefore they too disappear from the list of viruses under investigation. As things stand now, it seems likely that the group of new viruses comprises the following 11 entities: the Bwamba, West Nile, Semliki Forest, Ntaya, Bunyamwera, Zika and Uganda S viruses isolated in East Africa; the Anopheles A, Anopheles B and Wyeomyia viruses isolated in Colombia; and the Ilhéus virus isolated in Brazil.

Five of these seem to be the etiologic agents of unknown diseases. No immunological relations have been established between the Bwamba, Semliki Forest, Bunyamwera, Anopheles B and Wyeomyia viruses or with any of the known agents tested.

The remaining six appear to have antigenic components in common with a vast group of previously known agents.

These six, the Ilhéus virus from Brazil, the Anopheles A virus from Colombia, and the Zika, Ntaya, Uganda S and West Nile viruses from East Africa, are related to the viruses of yellow fever, dengue, St. Louis encephalitis, Russian spring-summer encephalitis, louping ill and eastern and western equine encephalomyelitis. Venezuelan equine encephalomyelitis and Rift Valley fever viruses may also belong to this group, although this remains to be proved.

Within this large group it is apparent that although all produce a systemic disease, some have viscer-

tropic affinities and others an affinity for the nervous system. Yellow fever, Rift Valley fever and dengue are examples of the viscerotropic members. The various equine encephalomyelitides, St. Louis, Japanese B, louping ill and Russian encephalitis belong to the encephalitogenic group. That the two groups are related is clearly shown by the immunological overlaps, one of the most striking of which is that between dengue and St. Louis encephalitis. The overlaps have been demonstrated by both neutralization and complement fixation tests.

These immunological overlaps occur not only between viruses causing the two clinically different types of disease, but also between viruses of different epidemiological patterns. Thus, an immune serum against louping ill — a virus transmitted in nature entirely by ticks — will neutralize dengue virus — which is transmitted by culicine mosquitoes. Similarly, a louping ill immune serum will neutralize the Ntaya virus, which was isolated from and presumably is transmitted by mosquitoes.

Growth and Behavior in Chick Embryos

An extensive study of the growth and behavior of the new viruses in embryonated eggs was completed. All of the viruses had been isolated by direct intracerebral inoculation or subinoculation of Swiss mice and had been carried through varying numbers of brain-to-brain passages in these animals.

These studies indicated clearly that the developing chick embryo is highly susceptible to the viruses. In several instances parallel titrations in mice and

embryonated eggs revealed a higher titer in eggs. In general, the susceptibility of chick embryos inoculated into the yolk sac compared favorably with that of young adult mice inoculated intracerebrally. After three to ten passages in the embryo, the majority of the viruses were capable of infecting embryos when introduced into the yolk sac in dilutions equal to or higher than those required to produce a fatal infection in mice.

With the exception of *Wyeomyia*, all of the viruses grew readily and could be maintained in serial passage by yolk-sac inoculation, using a suspension of the brain or body of the embryo for passage material. However, it was necessary to initiate cultivation of *Anopheles B* virus by intracerebral inoculation. The *Wyeomyia* virus was the most difficult to propagate in the embryo. It was carried through ten brain-to-brain passages in the embryo and then lost.

While, with the above exception, all of the viruses also grew well when inoculation was made into the amniotic sac, the yolk-sac route was preferred because injection could be made at an early age of the embryo and the infection followed over a longer period of time. Inoculation into the allantoic sac or upon the chorioallantoic membrane gave less consistent results. It would appear therefore that none of these viruses grow so well in the allantoic sac as in the body or brain of the embryos.

Ntaya, Bunyamwera, Bwamba, Uganda S, *Anopheles A* and *B* and Ilhéus viruses exhibited neurotropism when inoculated into the yolk sac, for greater

concentrations of the virus were observed in the brain than in the body of the embryo.

Semliki Forest, Mengo, West Nile and Zika viruses may be regarded as pantropic, as the virus concentrations in the body were equal to if not greater than those in the brain of the infected embryos.

Haemagogus A and B, Leucocelaenus and Sabethes, the four Brazilian viruses which are probably identical with FA mouse encephalitis virus, were consistently found in greater concentrations in the body of the embryo than in the brain.

Four of the African viruses, Semliki Forest, Mengo, West Nile and Ntaya, had one feature in common: they were invariably lethal to the chick embryo. Bunyamwera virus may also kill chick embryos when an inoculum containing more than 1,000 mouse MLD (minimum lethal doses) is introduced into the yolk sac. The remaining viruses are usually not fatal at least up until a day or two before the time of hatching.

The more obvious gross alterations consisted of congestion, edema and hemorrhage of the embryo skin and brain. The occurrence of hemorrhage was an outstanding feature. Of the four viruses that were regularly fatal to embryos, Ntaya was the only one inducing gross lesions confined mainly to the brain. Bunyamwera, Bwamba, Uganda S, Anopheles A and B and Ilhéus viruses frequently produced pin-point to large hemorrhages in the brain, especially during the latter stages of the infection; they appear to favor the brain as a locus of multiplication. No definite gross lesions were encountered among the embryos

inoculated with Zika, Haemagogus A and B, Leucocelaenus, Sabethes and Wyeomyia viruses.

The Semliki Forest and Mengo viruses produce a fatal infection within two days after inoculation. The various organs of the embryos remain normal in appearance until a few hours before death, when hemorrhages appear in the soft tissues of the body and head. The Ntaya and West Nile viruses produce a fatal infection in four to five days. Foci of encephalomalacia are found in the white matter, and there are small foci of hemorrhage into the neuroglial tissue of the basal ganglia. Similar but less extensive foci of neuroglial degeneration develop in embryos infected with Zika and Anopheles B viruses, but these develop later and do not kill the embryos.

The Bwamba virus infection is associated with extensive encephalomalacia and hemorrhage in both the brain and spinal cord. There is also degeneration of the ependymal epithelium and collection of a cellular exudate in the cerebral ventricles.

The chick embryos infected with Bunyamwera virus showed foci of encephalomalacia in both the brain and spinal cord, not regularly associated with hemorrhage. The foci of neuroglial necrosis are found in both the gray and white matter. The lesions observed in the brain of embryos infected with Ilhéus and Uganda S virus are essentially identical; they are also sufficiently characteristic to make it reasonably certain that one of the two viruses is present when such lesions are found. From the third to the sixth day after inoculation there is an acute degeneration of the cerebral cortex. Subsequently, the cerebral cortex fails to develop and hydrocephalus is produced.

The gray matter of the spinal cord likewise fails to develop. The infection is also associated with an acute degeneration of the retina.

Pathology in Mice and Hamsters

The pathology produced by the viruses in mice and hamsters infected by intracerebral inoculation indicates that some of these viruses prefer the neurons and others the neuroglial tissue cells. The viruses which produce encephalomyelitis include the mouse encephalomyelitis virus, the Mengo virus and the Semliki Forest virus. The Mengo infection is very similar to that of the mouse encephalomyelitis virus in that there is a uniform destruction of anterior horn cells with an associated marked neuronophagia. The lesions in the brain and spinal cord of animals infected with the Semliki virus are focal and associated with neuroglial degeneration. The other viruses appear to involve the neuroglial tissue and the neuronal degeneration is secondary. The Bunyamwera virus produces focal neuroglial lesions in the gray matter of the cortex and spinal cord.

The Mengo virus is the only one of these agents which produces a consistent destruction of the tissues of organs other than those of the central nervous system. The lesions include focal acute degeneration of heart muscle fibers, of striated muscle of the extremities and acinar necrosis of the pancreas.

Use of the Chick Embryo in Primary Isolation of Viruses

There should be no difficulty in recognizing infection of the embryo by the viruses that regularly

result in death of the embryo, but the recognition of infection by the nonfatal viruses poses a different problem. Gross lesions caused by these viruses are neither constant nor characteristic, although brain hemorrhages may give a clue to infection. Thus, until some simple means of identifying infection of the embryo by these viruses is devised, making it unnecessary to resort to subinoculation of mice for confirmation, nothing is gained by using embryos instead of mice for primary inoculation. The chick embryo, moreover, has the disadvantage of being highly susceptible to bacterial infection, and bacteria are inevitably present in suspensions of arthropods used in attempts to isolate viruses from arthropods. Nevertheless, the chick embryo should be used as an adjunct to mice and other laboratory animals in seeking viruses of this general category. Some new virus may be encountered which, like other well-known viruses, is infectious to the embryos but not to mice.

Biophysical Studies

Studies of the physical characteristics of the viruses are now well advanced. A great deal of the preliminary effort has necessarily been devoted to the designing of special equipment and the development of new techniques for the study of viral agents. The techniques for ultrafiltration to determine size are now reasonably well defined. Efforts at present are largely directed at perfecting the methods for purification and concentration of the viruses. Precipitation experiments with protamine sulfate show that

four, at least, of the viruses remain in the supernate, but that two others are precipitated almost totally by the protamine sulfate and are to be found in the general precipitation of protein substances which centrifugate out. Some work is also being done to improve the sensitivity of the optics of the centrifuge itself.

In connection with the ultrafiltration studies, progress has been made in adapting methods for the manufacture of collodion membranes of controlled porosity. The introduction of known amounts of water into the collodion mix is used as the basis for determining the ultimate pore size. One simplification is the use of propyl alcohol and acetone as the only solvents. A second fundamental improvement is the design of a closed chamber for controlled evaporation of the solvents, thus obviating the necessity for precise temperature and humidity control of the room in which the work is done. As the stock of graded collodion membranes has been built up, it has been possible to determine the approximate particle sizes of most of the new viruses. The results have been expressed in terms of the smallest pore diameter consistently passed by the virus. The sizes range from less than 52 millimicrons to as large as 220 millimicrons.

Sizes have been expressed in this way because it is clear that the structure of the membranes differs materially from that assumed in the development of the theory of ultrafiltration. There is considerable variability in the diameters and lengths of the pores.

The average pore diameter (obtained by water calibration) is calculated on the basis of certain

assumptions, chief among them that the pores are uniform cylinders running at right angles to the membrane surfaces. It is found in practice that the diameters of spherical particles which will in fact pass through such a membrane are considerably smaller. Examination of the actual structure of these membranes reveals that the passages are in no sense tubes of uniform cross section; the structure is a spongy one with intercommunicating, irregular passages of varying diameter running tortuously through the membrane. The length of passage is thus not the thickness of the membrane but is always greater than this. The effective diameter of a passage, on the other hand, will not be its average diameter, but its minimal value.

It has also become evident that there is considerable variation in the permeability behavior of a lot of membranes cut from the same sheet. This variance not only gives a measure of what to expect in membranes taken at random from the stock, but also gives some indication of the degree of variability of pore diameters within the individual membranes. In addition to the computed average pore diameter, a second statistical parameter is being employed, which is the standard deviation divided by the average pore diameter. This has led to the definition of an "end point," that is, the average pore diameter which will pass a given virus one half of the time. It would seem advisable to confirm end points given by a particular set of membranes by filtering additional biological material of known size and shape. More

definitive data on the size of the new viruses can then be obtained using the ultrafiltration techniques.

Egypt: Field Investigations

In Egypt a survey of viral and rickettsial diseases has been started in cooperation with a United States Navy research unit. So far the investigations have comprised: 1) efforts to isolate viruses and rickettsiae by inoculating human sera, suspensions of arthropods or the milk of cows, goats, sheep and gamooses into laboratory animals; 2) the collection of blood sera from native populations and animals to be tested for the presence of specific antibodies against viral and rickettsial agents. Most of the specimens were collected in the Sindbis area, firstly because a recent health and sanitary survey there has made collateral demographic information available, and secondly because infection with West Nile virus has been identified in this area.

From this preliminary work, it is evident that rickettsiae are harbored by Egyptian ticks, fleas and lice. At least some of these rickettsiae belong to the Rocky Mountain spotted fever-boutonneuse group. These rickettsiae are infectious to guinea pigs, although the manifestations of infection are inconstant. In some instances rickettsiae have been observed in the spleen and brain of suckling mice following the inoculation of arthropod suspensions; whether or not they are pathogenic to man remains to be determined.

While the West Nile virus was not isolated from human blood specimens, immunity tests suggest that

the infection is endemic. No evidence has been obtained as yet on the mode of transmission of the virus.

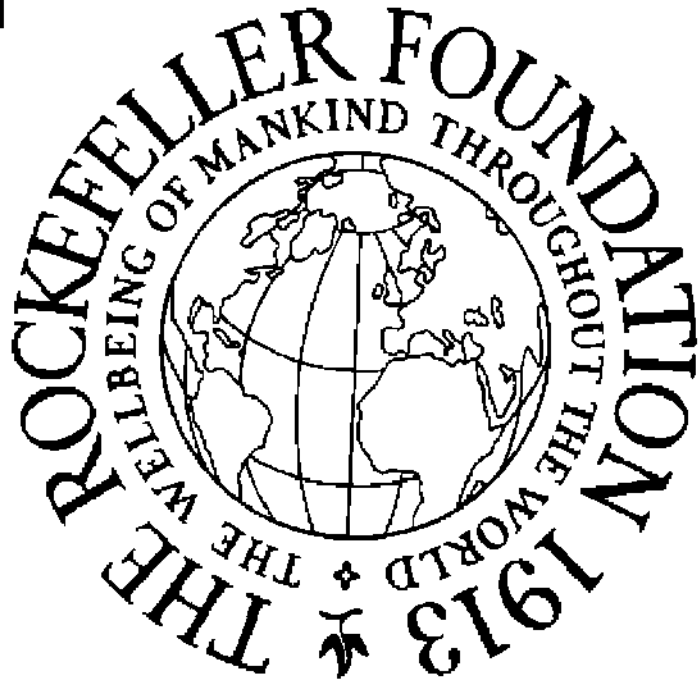
MALARIA RESEARCH AND CONTROL

ISLAND OF SARDINIA

Campaign Against Malaria Vector

In 1946 the Italian government in cooperation with The Rockefeller Foundation set up a special experiment in the Island of Sardinia to find out whether it is feasible to eradicate a malaria-carrying species of mosquito that has been in an area for centuries. As in the rest of Italy, the leading indigenous vector was *Anopheles labranchiae*. In this special campaign, however, it was planned to use DDT not only as a residual spray but also as a larvicide.

On October 1, 1945, the International Health Division of The Rockefeller Foundation agreed to assume technical direction of the campaign, and on April 12, 1946, a semigovernmental agency under the Italian High Commission for Hygiene and Public Health was established to carry out the work. This agency came to be referred to as ERLAAS (Ente Regionale per la Lotta Anti-Anofelica in Sardegna). Funds were made available first by the United Nations Relief and Rehabilitation Administration and later by the Economic Cooperation Administration. The campaign was concluded in 1950, after four and one-half years of intensive operations. It cost more than six billion lire, or 12 million dollars. Of this sum, the Foundation supplied \$389,411, together with the services of several of its staff members.



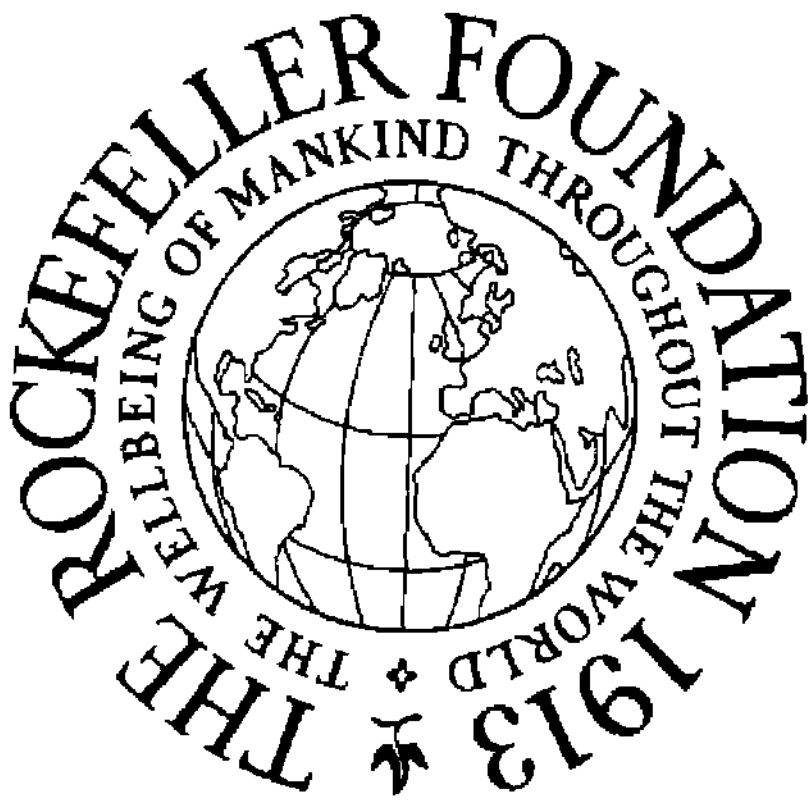
Photograph Excised Here

As part of Tulane University's Law-Science Program, lawyers in key cities of the region are given graphic demonstrations of medical problems

Scottish terriers used for behavior studies at McGill University



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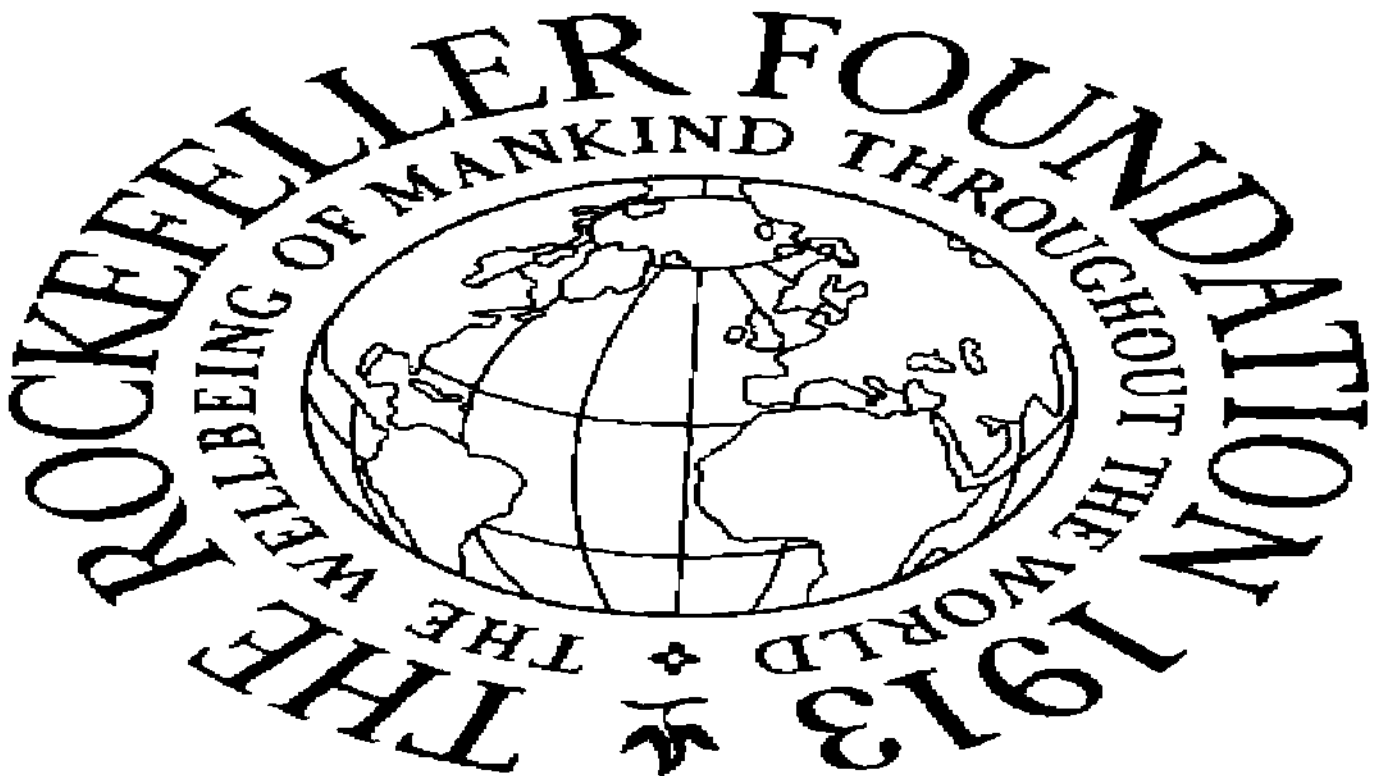


Photograph Excised Here

Suschinsky

A field crew of the malaria control campaign in the Island of Sardinia

New York laboratories of the Division of Medicine and Public Health; manifold for filtration of a biological fluid through colloid membranes of various pore diameters



Photograph Excised Here

In the course of the campaign, alternate DDT residual spraying and larviciding operations were carried on each year. Near the end of the campaign, special eradication techniques were devised to find and eliminate the few remaining *labranchiae* mosquitoes. The island was completely mapped to locate all shelters which might harbor adult specimens and all aquatic habitats of the larvae. The island was divided and subdivided, the smallest unit for treatment and inspection purposes being a section of about 4.5 square kilometers. Many field camps were built to serve the various regions. Supplies and men were transported by a fleet of over 250 former army jeeps and weapons carriers, aided by animal transport. Fog generators, helicopters, boats, rafts and specially designed larvicide "bubblers" were used in the larviciding program. Considerable clearing and drainage work was necessary. In fact, by the end of the campaign some 30,000 hectares of swampland had been reclaimed. At one time (August 1948) the labor force amounted to more than 33,500 men.

The result by 1951 was that Sardinia, formerly one of the most severely afflicted regions on earth, had been freed of malaria. It is now possible to live and work anywhere in the island. Malaria transmission has been reduced to a very low level, and there is no reason to expect that it will again become a public health problem provided that adequate precautions are maintained. No new cases were verified in 1950, and of three new cases reported in 1951, only one can be considered a primary infection. The number of malaria cases fell from a total of 78,173 (primary

malaria, reinfections and relapses) in 1944 to 44 in 1950, and to nine in 1951.

Unfortunately, the guilty mosquito, *Anopheles labranchiae*, by reason of its centuries of adaptation to all types of habitats in the island, had succeeded in escaping complete annihilation. Despite the most painstaking scouting of all known water surfaces and possible adult shelters, this mosquito continued to be found occasionally in areas where eradication appeared to have been achieved much earlier. In 1950, as a result of over 2,200,000 larval inspections, a total of 1,379 specimens were collected. Twenty-eight adult *labranchiae* were found in the course of 178,279 inspections.

On the conclusion of ERLAAS operations in 1951, the Italian government decided not to continue the attempt at *labranchiae* eradication in Sardinia but to include the island in its normal residual spraying program. The regional government later elected to continue the eradication attempt and to this end reorganized the scouting and larviciding service, utilizing former ERLAAS personnel. In 1951 these activities were carried on simultaneously with the residual spraying work.

To consolidate the health benefits of the malaria campaign, Sardinia has established a regional public health organization to administer health services on an island-wide basis. The regional director of health plans to integrate the public health services through the establishment of health units in important communes and has requested the advisory services of a member of the Division of Medicine and Public

Health. In 1951, The Rockefeller Foundation made a grant in aid of \$5,170 for the purpose of supplying these services.

The radical decline in malaria and the extent of the unexploited resources in Sardinia have aroused great interest in rehabilitation. The regional and central governments have accordingly established a commission to make a socioeconomic survey of the island. The survey will cover the fields of agriculture, mineral resources, social sciences, industry, public works, commerce and finance. The long-range development plan expected to emerge from this survey will offer Sardinia an opportunity to conserve, develop and utilize its potentially valuable island resources in the future. A new Italian frontier has been established which is capable not only of internal development but also of absorbing some of the excess population from the mainland of Italy.

INDIA

Mysore State Control Studies

The malaria control program carried on by representatives of The Rockefeller Foundation in collaboration with the Mysore State health department concentrated during 1951 on a survey of the distribution and behavior of *Anopheles fluviatilis*. A 1951 grant in aid of \$8,354 from The Rockefeller Foundation was made in support of the program. Past work in India incriminated this mosquito as the vector of hyperendemic malaria in some of the hill areas. However, malaria is not always hyperendemic within the general range of *A. fluviatilis* in the hills.

To explain this discrepancy, studies on the bionomics of *fluviatilis* were continued. These studies were started in three areas near Sakleshpur field station which had never had DDT treatment, had reasonably high malaria rates and also presented varying examples of terrain. It is suspected that physiographic considerations may have a considerable bearing on the apparently irrational distribution of malaria in this area.

The chief difficulty in bringing all malarious areas in the state under control at present is the shortage and high cost of DDT and DDT solvents. A system of logistics is being worked out to increase the efficiency and lower the cost of supplying field units with materials for house spraying. Determinations of the optimum dosage of DDT for house spraying programs, the most satisfactory interval between applications and the residual effectiveness of DDT under field conditions are almost completed.

A further project initiated in 1951 was the establishment of a school for training malaria workers at Mandya. Equipment and housing were arranged and a curriculum prepared. The first class of medical officers and sanitarians was in training at the end of the year.

Another malaria project has been carried on in the Channarayapatna area with technical advice and help from the Foundation since 1950. A serious malaria problem had developed in this area connected with its irrigation system. A program of DDT residual spraying was started by dividing the area into three zones and using a different method of treatment

in each in order to determine the optimum spraying technique. The indication is that spraying the houses at three to four month intervals with 100 milligrams of DDT per square foot gives adequate protection.

MEXICO

In Mexico The Rockefeller Foundation is bringing to an end a long-standing program of cooperation with the government in the field of public health. For some 30 years, projects bearing on disease control and the development of public health services and training areas have been administered jointly by the Mexican Secretariat of Health and Welfare and the Foundation; in most instances these projects have received supervision from a field representative of the Foundation. In arranging for the termination of Foundation aid, the several agencies of the secretariat are preparing to take over responsibility for the various aspects of the program.

Although malaria is still a major problem in Mexico, extensive studies have been made on the mosquito vectors, and control campaigns throughout the country are gradually forcing down the transmission rates. Chief among the campaigns in which the Foundation has cooperated are those in the States of Veracruz, Morelos and Guerrero, the Southern Territory of Lower California and the Federal District around Mexico City. An insectary established at the Institute of Tropical Diseases just outside the capital fills an important role in supplying live material for the programs of DDT testing and for laboratory transmission studies.

Spraying Programs

In the State of Morelos extensive experiments have been made to evaluate the effectiveness of control measures on the local vector, *Anopheles pseudopunctipennis*. DDT residual house spraying has proved an effective weapon against this mosquito. Five years of observation in two villages of the region indicate that an estimated 75 to 90 per cent reduction in incidence of malaria has resulted after annual spraying. In one house sprayed in 1949 at the rate of 200 milligrams of DDT per square foot the insecticide has retained residual activity up to 24 months.

Incidentally, on two occasions, four and five years after the start of a DDT spraying program, anophelines from the region were tested for evidence of development of resistance. They proved to be no more resistant than specimens from two regions which had never been treated with DDT.

The DDT residual spraying program in the Southern Territory of Lower California has been more successful than most of the control programs in Mexico. While the reasons are not entirely clear, it may be concluded that anophelines in this semidesert region are obliged to seek favorable microclimatic conditions inside dwellings if they are to survive. Hence prompt and dramatic control of malaria is achieved by residual spraying.

In the State of Guerrero, antilarval services have been extended to 70 communities, and DDT residual spraying programs have been carried out in 15 communities. This program, which is one of work with

the people on a community level, will continue to receive Foundation support in 1952.

A considerable amount of information has now been accumulated on the endemic malaria problem in the Valley of Mexico. The Xochimilco-Mixquic region of this valley, well-known to tourists, is situated from 10 to 30 miles to the south of Mexico City at an altitude of some 7,500 feet. The region contains a maze of hundreds of kilometers of canals, some navigable with small boats. It is a fertile truck gardening and flower growing section. The abundant water vegetation which clogs the smaller canals is cut and spread over fields as fertilizer and binder for the mucky soil, or is fed to livestock.

Anopheles aztecus is the principal malaria carrier of the region. It has been found naturally infected with *Plasmodium vivax*, which appears to be the only endemic species of malaria parasite present in the area, and it will transmit this parasite in the laboratory. Adult mosquitoes may be found in the houses throughout the year and bite man freely. In spite of the many favorable breeding places, however, climatic factors apparently limit the development of large numbers of aztecus in this region.

In view of the house-haunting habits of the adult mosquitoes, DDT residual house spraying was chosen as the most effective, as well as the most economical, means of controlling malaria around Xochimilco. Following experimental spraying programs in two villages in 1948, the health authorities of the Federal District carried out more extensive work in 1949. A total of 5,421 houses were sprayed with DDT at a

total cost of about \$3,000. Malaria surveys before and after treatment indicated that excellent control had been achieved. It was recommended that a repeat spraying be made in two years, that is in 1951. After this it would seem to be sufficient to keep watch over conditions in the area and respray only when new cases of malaria begin to appear.

Duration of DDT Residues

Observations made in different countries on the effectiveness of DDT residual deposits in anopheline control reveal that far from uniform results are obtained. Causes for this lack of uniformity may rest in several factors. The mosquito species is undoubtedly an important factor, or at least a confusing one, since species differ markedly in habits, including house-resting routine, and they may possibly vary in response to minimal exposures to DDT. Another factor of undoubted importance is the surface on which the DDT is sprayed. Soil, as in sun-baked adobe bricks, or in a plastering mixture (wet soil alone, or wet soil mixed with straw or manure) applied over a wall of woven reeds or branches, is a common construction material in the tropics. In some localities, a DDT residue on these materials may lose its toxic effect within a few months or even weeks.

Studies in Mexico have shown that with some adobes there is evidence of persistence of DDT activity for a period of years. In a series of controlled experiments adobe bricks used in four malarious regions were sprayed with a DDT water-wettable powder at a rate of about 200 milligrams of DDT per

square foot. *Anopheles aztecus* and *Anopheles albimanus* were the mosquitoes used in these experiments. Adobe made with lake-bottom loamy soil with high organic content allowed the DDT to retain a high degree of activity for nearly three full years. Sandy clay from the State of Morelos held activity for a year and more. On the other hand, the red clayey soil from the State of Michoacán and deltaic deposit from the Coyuca River in the State of Guerrero inactivated the DDT in three to six months.

It was found that this loss of activity was due to sorption of the DDT, with attendant loss of crystalline structure, and later actual decomposition, or dehydrochlorination, of the DDT. Chemical analyses reveal that the soils which catalyze the decomposition of DDT most effectively are those highest in iron and aluminum. The conclusion is that the iron oxide fraction of the soil is responsible for the catalytic activity. The method worked out for determining the dehydrochlorination activity of different soils makes it possible to test a given soil in as short a time as three hours, thus eliminating the need for more time-consuming soil analyses.

The problem of very rapid decomposition of DDT when in contact with some soils demands the development of a practical method to avoid such decomposition. Whitewashed surfaces, for example, seem to retain DDT activity for relatively long periods of time, provided that whitewashes with low iron content are used. A search is being made for substances which can be added to the spray mixtures to inhibit the decomposition of the DDT by blocking the

catalyst. Different results may be obtained also, depending on whether the DDT is applied as kerosene solution, emulsion, or suspension of water-wettable powder. The suspensions have been observed to be more effective than kerosene solutions because the solutions sink deeper into the adobe, out of effective range as a contact insecticide, and come in closer contact with iron oxides in the adobe.

BRAZIL

Malaria Institute

During 1951 a Foundation staff member continued to cooperate with the personnel of the entomological laboratory of the Malaria Institute at Rio de Janeiro in testing insecticides, herbicides and molluscicides and their methods of application. Work was begun on malaria infection in primates, and a field station for raising mosquitoes has been set up.

Because malaria mosquitoes were using water-holding plants (bromeliads) as breeding places, the species control of bromeliads had been worked out in the laboratory, using 2, 4, 5-trichlorophenoxyacetic acid. The acid can be applied directly to the plants by means of a telescopic aluminum pole. This technique is now ready for field tests.

ISLAND OF TOBAGO

Control of *Anopheles aquasalis*

The malaria division of the Medical Department of Trinidad and Tobago continued its campaign for the control and possible eradication of malaria and *Anopheles aquasalis* from the Island of Tobago.

The campaign has been a cooperative project with the International Health Division since 1948. In 1951 a grant in aid of \$5,400 was made available for the support of this project. The work of draining all except two of the larger swamps was completed or nearing completion, while the usual residual spraying of all houses and an active larval control campaign were continued. No adult *aquasalis* were caught, but occasional larvae are still found in the undrained areas. The incidence of malaria has fallen to an insignificant level.

Unfortunately much of the mosquito breeding swampland problem is caused by shifting sand and debris at the tidewater outlets of streams and ditches. Especially during the dry season, the wave action and tides build up bars which close the sea outlets. Although much has been accomplished by draining the larger swamps, oiling along streams and spraying houses with DDT, more drainage work is in prospect, and measures against the mosquitoes in both their larval and adult stages must be continued.

VENEZUELA

Nation-wide Control Campaign

Some five years ago, the Venezuelan government and The Rockefeller Foundation established a cooperative malaria research laboratory at Maracay. In charge of the laboratory and head of the Division of Malariology of the National Health Department since 1936 is Dr. Arnoldo Gabaldón. Dr. Gabaldón is a former fellow of the International Health Division. Closely coordinated with Venezuela's nation-wide

malaria control campaign, the research program has been primarily concerned with testing the effectiveness of residual insecticides on mosquitoes, triatomids and other insects of medical importance. Studies have been made on the biology of various species of flies, and special tests were run on a strain of *Culex* that has shown mutations following exposure to DDT.

In connection with experiments to breed a DDT-resistant race of *Culex fatigans*, it is of interest that gynandromorphism appeared in specimens of the sixth filial generation. Of 8,751 adult mosquitoes obtained from the sixth through the tenth filial generations, 50 gynandromorphs were observed. A form of hermaphroditism in which certain parts of the body reveal both male and female characters, gynandromorphism is very rare among mosquitoes. Up to the present time, only 25 mosquito gynandromorphs have been reported in the scientific literature.

LABORATORIES OF THE DIVISION OF MEDICINE AND PUBLIC HEALTH

Plasmodium Studies

Simultaneously with its field programs in the control of malaria, The Rockefeller Foundation since 1933 has carried on extensive laboratory investigations on the malaria parasite and its behavior in the mosquito and the vertebrate host. With the close of the investigations in 1951 it was felt that many new avenues had been opened up which might be profitable to other workers.

The purpose of the malaria investigations has been to discover a chemical means of destroying the malaria parasite, or plasmodium, during its cycle in the human host. While there are several drugs that will suppress the disease, medical science at the present time has no way of curing the vivax type of malaria, one of the two types that commonly attack man. Because the vivax parasite can apparently maintain itself indefinitely somewhere in the human body, it may cause relapses over a period of years.

To find some new line of attack, much attention has been given to studying the life of the parasite. It passes its sexual cycle in certain species of anopheline mosquitoes, but once it has entered the human body or some other vertebrate host through the bite of an infected mosquito, it starts an asexual cycle which is not completely understood. In one of its several phases it grows and multiplies in the red blood cells, in another it apparently hides out in the liver. Some phases of the cycle are particularly resistant to drug therapy.

The laboratory staff early recognized that one important thing to look for was a difference between human metabolism and plasmodium metabolism. The search was complicated by the fact that the metabolic requirements of the parasite are astonishingly similar to those of man. However, if some critical step necessary to the parasite but not necessary to man could be detected, it might be possible to devise a drug that would neutralize that step and thus interrupt the chain of biochemical reactions by which

the parasite lives. Such a drug would be injurious to the parasite but harmless to man.

The parasite most used throughout the malaria studies was *Plasmodium gallinaceum*, which causes malaria in chickens. *Aedes aegypti* served as the insect host because it will transmit avian malaria in the laboratory and is easily bred in captivity.

Copper Studies

The malaria parasite has many types of hosts, but only one type of vector, the mosquito. On the theory that the parasite is highly adapted to the mosquito vector, an attempt was made to learn whether there was something in the mosquito's metabolism which was not in man's and which, through long association, had become essential to the parasite. Arthropods are known to possess a high concentration of copper. Moreover, malaria-infected blood has a higher concentration of copper than healthy blood.

Copper is presumed to serve as part of an oxidizing enzyme, and therefore the amount of oxygen being taken up by the malaria parasite is an index to the activity of copper. If copper could be neutralized by some reagent, the effect should be inactivation of the enzyme and thus a decrease in the amount of oxygen being taken up. Evidence was obtained that the parasite has an enzyme system or systems which can be blocked by a copper inhibitor. However, it was subsequently found that a similar blocking effect was produced when the same inhibitors were tested against tissues of the chicken, the vertebrate host of the parasite.

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In another approach to investigating the possibility of key metallo-enzyme systems common to parasite and vector, the following agents known to chelate, or bind, with copper were tested for activity against the parasite and against *A. aegypti* larvae: phenylthiourea, cupron, salicylaloxime, potassium ethyl xanthate and the 8-hydroxyquinoline and oxine. All agents, with the exception of oxine, showed activity against both parasite and larvae but were more active as larvicidal than as parasitocidal agents. The tests for activity against the parasite were made with sporozoites. (The sporozoite is the form of the parasite which is liberated from the oocysts located in the wall of the mosquito's stomach. The sporozoites accumulate in the salivary glands and are transferred to man in the act of feeding.) Oxine was much more active against the sporozoite than the other agents studied, whereas its larvicidal potency was about the same as that of the other agents.

In addition, sodium cyanide was tested, as it is a known inhibitor of both copper- and iron-containing enzymes. This substance was much more effective against the insect than against the parasite.

Several known antimalarial drugs tested in this comparative manner were shown to have a much greater degree of activity against the parasite than against the mosquito.

In summary, it was found that agents known to chelate with copper all inhibit to some degree the activity of the sporozoite form of the parasite. Whether the activity of these copper-chelating agents can be taken as proof of the general importance of

copper to the parasite remains open to question. The addition of copper not only fails to reverse the inhibitory effect but, in certain cases, markedly enhances it. The lack of correlation observed between the degree of parasitocidal and larvicidal action of the metal chelators, on the one hand, and of the anti-malarial drugs, on the other, does not favor the hypothesis of key metabolic systems common to the parasite and the insect host. However, only a relatively small group of inhibitors has been studied in this comparative manner, and it is entirely possible that the extension of the same method to a variety of other types of inhibitors might yield more definitive results.

Parasite Growth Studies

The growth processes of the parasite were also studied. Phosphorus is an essential element for the synthesis of many fats, proteins and nucleic acids and may be introduced into the growth medium in the form of radioactive phosphate, which serves as a tracer. In studies made with intact normal and parasitized cells it was found that the radioactivity of various fractions of the cells was significantly higher in parasitized than in normal cells. The greatest differential activity in favor of the parasitized cell was found in nucleic acids. One nucleic acid fraction contained radioactivity only in the case of parasitized cells, whereas the corresponding normal cell fraction was completely inert. The incorporation of radioactive phosphorus into this nucleic acid fraction presumably implies the synthesis of new fraction.

Since such synthesis does not occur in the mature normal cells but seems specifically related to the presence of the parasite, the amount of radioactivity can be used as a quantitative measure of parasite growth processes. Such a technique has the advantage of complete objectivity which is lacking in the comparative examination of stained films. It also permits the detection of much smaller differences between various experimental preparations than is possible by film examinations.

In Vitro Studies

The blood, or erythrocytic, form of the parasite was studied both by investigation of the conditions necessary for its prolonged cultivation in vitro and by determination of certain of its biochemical and metabolic characteristics. Optimal conditions and major requirements for successful cultivation of *Plasmodium gallinaceum* were determined. Blood plasma contains constituents essential to the parasite or parasitized cell. It was suspected, however, that certain components of plasma exert an unfavorable effect upon parasite multiplication. Solution of these difficulties was found by modifying a medium which was reported successful for the cultivation of lysed cell preparations of *Plasmodium lophurae*, a fowl malaria parasite. The medium consisted of a very high concentration of fresh normal red cell extract prepared in heat-inactivated plasma. The highly concentrated extract seemed an effective substitute for excess red blood cells. With this medium it was found possible to carry one culture through eight generations over

a period of 13 days without decrease in parasite concentration. Another culture was carried through ten generations with no decrease in the number of parasites as determined by direct count and by inoculation into chicks. That the parasites thus cultivated were in all respects normal was indicated by successful infection of mosquitoes on chicks inoculated from the culture with, in turn, successful transmission of the infection via these mosquitoes to normal chicks. With the termination of the malaria program this culture was discontinued, although there was no reason to believe that it could not have been maintained indefinitely.

OTHER STUDIES

INDIA

Mysore State Anemia Studies

The Mysore State anemia investigations, started in 1949 as a cooperative enterprise with the Indian Health Department, were continued during 1951 and a grant of \$3,500 has been made to assist this work during 1952. The field studies have confirmed the expected high percentage of anemias in the area. As the data available for evaluating the background of these anemias is insufficient, complete hematological examinations, stool examinations, blood smear examinations for malaria parasites, diet studies and general physical examinations were made whenever possible.

The field studies of the Closepet health center area were completed early in 1951. These studies showed a

high prevalence of microcytic-hypochromic anemia, confirming preliminary observations. Anemias were particularly prevalent and severe in the adult female group, presumably accentuated by the stress of repeated childbearing.

Similar field studies were conducted in the Chickmagalur District, an area of high rainfall, formerly very malarious, and are now under way in the drier Chitaldrug District. In the Chickmagalur District positive reactions to serological syphilis tests occurred in 5 per cent of the persons tested, while in the Chitaldrug District 30 to 40 per cent reacted positively. Although the reasons for this apparently high syphilis rate may not be of much importance as a causative factor in anemia, they do call attention to the extent of the syphilis problem.

TENNESSEE DEPARTMENT OF PUBLIC HEALTH

Williamson County Tuberculosis Study

The Williamson County Tuberculosis Study of the Tennessee Department of Public Health has had, since its initiation in 1931, the support of The Rockefeller Foundation. In 1951 a grant of \$17,160 was made to continue this epidemiological study during the coming year. The findings are made available for teaching purposes in connection with the medical and nursing courses at Vanderbilt University.

An early and significant finding of the study group was the high incidence in the county of persons with pulmonary calcifications. When these persons were checked by the tuberculin skin test, it was found that many of the pulmonary calcifications were not

associated with tuberculous infection. A fungus disease, histoplasmosis, caused by *Histoplasma capsulatum*, is probably the major cause of the pulmonary calcifications. During the past year the study group succeeded in isolating *H. capsulatum* from samples of soil from two different parts of the county. To trace various sources of infection, the testing of cattle for histoplasmosis has been started and laboratory studies of the disease have been extended.

One of the primary methods used in the long-range program of the study of tuberculosis is the investigation of households with at least one tubercular member. In the past year, tuberculosis attack and death rates were analyzed for 1,358 household associates of 298 sputum-positive index cases which had been investigated during the 20-year period of the study. Two racial groups, white and Negro, were studied and the amount of information obtained for each was sufficient to permit analysis according to age, sex and relationship of the household associates to the index case. In general, in all the categories the attack rates for the Negro associates were higher than for the white associates.

The investigations according to age and sex showed that the highest attack rates occurred in young females — white females from 15 to 34 years old and Negro females from 10 to 24 years old. The attack rate for males was lower but, as in the case of the females, the critical period for the incidence of the disease also tended to be in young adult life. The attack and death rates for the close relatives (parents,

children, and brothers and sisters) were two or three times higher than for the other members of the household group.

DEVELOPMENT OF THE HEALTH SCIENCES

MENTAL HEALTH AND DISEASE

NATIONAL ASSOCIATION FOR MENTAL HEALTH

General Support

The National Association for Mental Health came into being in September 1950 through the merger of the three largest voluntary organizations in the field of mental hygiene: the National Committee for Mental Hygiene, the National Mental Health Foundation and the Psychiatric Foundation. The consolidation stemmed from the conviction, shared by all three agencies, that adequate promotion of mental hygiene in the United States required pooling the efforts of all concerned into one national association. The new organization places strong emphasis on building up diversified and widespread support for mental health activities on the state and local levels.

The program of the association is threefold: to continue the educational and service activities of its parent organizations; to give direction and stimulus to some 200 existing mental health societies throughout the country, creating additional local societies where advisable; and to conduct a vigorous campaign for funds from large numbers of individual contributors. In order to implement the first two of these

goals the association is engaged in activities which include:

- 1) Support for research projects on dementia praecox
- 2) A hospital rating program for raising the standards of public and private mental hospitals
- 3) Preparation of professional and public educational material in the form of books, pamphlets, manuals, surveys, bibliographies, guides and exhibit material
- 4) Publication of two quarterly journals, *Mental Hygiene* and *Understanding the Child*
- 5) Efforts to raise the level of training for mental hospital attendants and psychiatric aides
- 6) Studies of commitment procedures and of laws relating to the insane and mentally defective and to hospital practices
- 7) Advice to psychiatric and child guidance clinics

The successful expansion of these activities requires fulfillment of the third goal. The level of care in our mental hospitals and child guidance clinics will depend considerably on a broadened base of public support for mental health. A strong national voluntary organization is probably the most effective stimulus to such support. In recognition of this The Rockefeller Foundation, which has given substantial assistance to the National Committee for Mental Hygiene and the National Mental Health Foundation, in 1951 appropriated \$100,000, available for one year, to the National Association for Mental Health.

UNIVERSITY OF CHICAGO

Psychotherapy

Despite the amount of public and professional attention recently directed toward expanding facilities

for the treatment and prevention of mental illness, there is a paucity of data on the effectiveness of psychotherapy. Little valid information exists on such important points as how often changes in behavior and feeling occur, how long such changes last or what conditions are most favorable for their appearance. This lack of accurate knowledge is the quite natural result of many factors, such as the intrinsic difficulty of the problem, the tendency of science to attack the less complex problems first and the relative lack of trained investigators in the profession of psychiatry. Nevertheless it seems desirable to encourage whenever possible the development of methods for evaluating and improving the results now obtainable by psychotherapy.

One form of psychotherapy which has some peculiar advantages as a preliminary subject of study is that known as client-centered or nondirective therapy. It is based on rather simple assumptions, requires a relatively short period of time and is largely used in patients whose emotional problems are not so incapacitating (and are presumably not so complicated) as those encountered in medical clinics. Furthermore it is a subject of considerable interest to professional psychologists, many of whom have given a good deal of thought to developing methods of scientific measurement of the elements of human behavior.

The principal protagonist of this method is Dr. Carl R. Rogers, director of the Counseling Center of the University of Chicago. The center, a division of the university's Department of Psychology, offers assistance both to members of the university and to

the community at large and provides training in the special nondirective psychotherapeutic techniques pioneered by Dr. Rogers.

During the past four or five years Dr. Rogers and his co-workers, who include eight faculty members from the Department of Psychology and about 20 candidates for the doctorate degree in clinical psychology, have been devoting a large part of their energies to investigating the nature of the psychotherapeutic process. This research aspect of the center's activities has had the support of The Rockefeller Foundation since 1949. In 1951 the Foundation renewed its aid with a grant of \$127,000 to help cover the expenses to be incurred during the coming three-year period.

The current research program at the Counseling Center is concerned with devising procedures for identifying the changes which may occur in the client during the course of therapy and also with analyzing the results so as to test the basic tenets of the psychotherapeutic method itself. All therapeutic interviews are recorded in their entirety. The recordings are then examined almost word by word for clues as to what is happening in the relationship between the client and the therapist. Records are also kept of various physiological changes and of the way the patient adjusts to his home and business situation. In this way it is proving possible to identify significant changes resulting from therapy and to assess in some measure the efficacy of treatment. It is hoped that some of the procedures under investigation at the University of Chicago may be adopted for use by

other groups and extended to the study of other types of treatment.

CLINICAL RESEARCH

UNIVERSITY OF AMSTERDAM

Psychosomatic Medicine

One of the medical clinics in Europe interested in the emotional aspects of organic illness is the psychosomatic unit directed by Dr. Juda Groen at the Wilhelmina Hospital, the principal teaching hospital associated with the University of Amsterdam. This unit was established by Dr. Groen with Rockefeller Foundation assistance shortly after the close of World War II as a result of wartime experiences that convinced him of the relationship between emotional stress and organic disease. The unit has since become an integral part of the hospital and operates in close cooperation with several other clinical departments, notably the Department of Psychiatry.

Dr. Groen's original findings concerned the intestinal disorder known as ulcerative colitis; it was found that when emotional strain was relieved the colitis promptly improved. The program at the Wilhelmina Hospital has thus far concentrated mainly on bronchial asthma, peptic ulcer and hypertension, plus additional cases of ulcerative colitis. Investigations on psychosomatic relationships in rheumatoid arthritis, hyperthyroidism, diabetes and multiple sclerosis are also under way. In an interesting project on cholesterol metabolism, Dr. Groen and his collaborators have found that emotional stress can

alter the blood cholesterol level entirely independently of the subject's diet, a finding which may have some bearing on the origin of degenerative diseases.

For continuation and expansion of this program in psychosomatic medicine at the Wilhelmina Hospital, the Foundation in 1951 made a five-year grant of \$58,500 to the University of Amsterdam. Plans for the future lie along two main lines. The first is a continuation of the effort to identify and analyze psychogenic factors in diseases where physiologic function is disturbed. The second phase of the program, in which the Department of Psychiatry cooperates closely, is directed at developing convenient, reasonably rapid and economical methods of therapy. Dr. Groen is primarily a specialist in internal medicine, hence his interest in finding psychotherapeutic techniques which can be used as adjuncts to more usual methods of treatment. Encouraging results have already been obtained in the psychotherapy of peptic ulcer and ulcerative colitis, and the group wishes to explore the possibilities of psychotherapy, including group psychotherapy, in other diseases. It is also hoped to offer training in the psychosomatic aspects of medicine to young internists who will spend periods of six months to one year in the unit under the combined guidance of the internist, the psychiatrist and the physiologist.

DALHOUSIE UNIVERSITY

Psychological Factors in Obstetrics

There is growing evidence that the psychological condition and emotional attitudes of the prospective

mother during the prenatal period are important not only in the reproductive process itself but in the care of the future child as well. With the aid of a three-year grant of \$22,500 from The Rockefeller Foundation, a study of the psychological and psychiatric factors in pregnancy and childbirth was begun in 1951 by the Medical School at Dalhousie University, Halifax, Nova Scotia.

In this project, a joint undertaking of the Department of Obstetrics and Gynecology and the Department of Psychiatry, the first step consists of determining as precisely as possible the psychological attitudes of women attending the prenatal clinic. These attitudes are then correlated with the patient's general health during pregnancy and labor. The results of both these steps are in turn applied to an analysis of the subsequent maternal care of the children and of the children's progress as observed in the university's child guidance clinic. The study is also expected to help in the selection of patients for different methods of delivery.

UNIVERSITY OF OREGON MEDICAL SCHOOL

Constitutional Medicine

Many practicing physicians have noticed from time to time that certain types of diseases tend to appear in certain types of people. Lay persons, too, have built up a whole series of generalizations about who gets which malady. Thus we have the popular image of the tall, reedy individual who is supposed to suffer from a "weak chest" and the stocky, red-faced individual who is assumed to be a likely candidate for

a stroke. However, these impressions have never been organized in a systematic way; the puzzling relationship of body type, or "constitution," to the incidence of disease remains to be clarified.

Aided by a five-year grant of \$100,000 from The Rockefeller Foundation, the University of Oregon Medical School in 1951 launched a broad-scale investigation into this problem. The program is under the direction of Dr. Howard P. Lewis, chairman of the Department of Medicine. The measurement and classification procedure used is the technique developed by Dr. William H. Sheldon of Columbia University known as somatotyping. This system involves three fundamental components — endomorphy, mesomorphy and ectomorphy — which predominate in varying degrees in different individuals. Of course, very few people represent pure examples of any one type, but in a general way it can be stated that the endomorph is rotund, lightly boned and lightly muscled, the mesomorph sturdy with heavy bones and muscles and the ectomorph slender with a long and narrow musculoskeletal development. By assigning a graded scale of values (from 1 to 7) to each component it is possible to arrive at a numerical formula for any given individual. The somatotyping system of classifying physique is simple to use, reliable among different observers and, most important, lends itself easily to statistical analysis.

Preliminary use of somatotyping in several clinics has suggested that it is possible to correlate the incidence of certain diseases like peptic ulcer and hyperthyroidism with certain identifiable body types.

Professor Lewis and his group are now attempting to apply the method to a wide range of unselected cases in order to arrive at statistically valid results. At present only patients entering the general medical clinic are being included in the study, but plans have been made to somatotype patients from the specialty clinics and from the university hospitals later as the program progresses. A large store of information on the body type of patients over the entire organic disease spectrum will thus be built up. It is hoped that careful analysis of this data will help bring the discipline of constitutional medicine to a point where it will be utilizable for the diagnosis, prevention and treatment of disease.

UNIVERSITY OF MINNESOTA

Dight Institute for Human Genetics

The sum of \$27,300 was granted by The Rockefeller Foundation to the University of Minnesota in 1951 for research at the Dight Institute for Human Genetics over a period of three years. The institute was established in 1941 through a bequest from Dr. Charles F. Dight of Minneapolis for the purposes of providing education in human genetics, carrying on research and furnishing free counseling service to people with genetic problems. The activities of the institute are directed by Dr. Sheldon C. Reed, a geneticist. Dr. Ray C. Anderson, a physician who also is a member of the university's Department of Pediatrics, has chief responsibility for the counseling work. Several graduate students receive training and participate in the institute's program.

Contacts with the state departments of education and mental health and a large collection of family histories donated to the institute by the Cold Spring Harbor Laboratories provide research materials. The state institutions are cooperating actively in studies aimed at unraveling the genetics of human intelligence and feeble-mindedness. The institute also enjoys the advantage of close ties with the university hospitals, which enable it to observe hereditary anomalies that do not ordinarily fall within the purview of a purely scientific organization.

The genetic advisory service represents a large segment of the operations of the institute. Dr. Reed and Dr. Anderson work closely together on the analysis of all cases. The case load, at present about 200 a year, is growing steadily, and Dr. Reed estimates that it may soon reach 1,000. However, the counseling program is still primarily experimental in nature, for problems in medical genetics have been pretty much neglected despite the fact that they are quite common.

Professor Reed wishes to expand the institute's research program by augmenting considerably the accumulation and analysis of scientific data, by following up clients already served to see what effect the counseling has had and by enlarging the counseling service. The aim is to arrive at a sound and systematic method of handling genetic problems.

CHILD RESEARCH COUNCIL OF DENVER

Child Development

Rockefeller Foundation support for the Child Research Council of Denver, Colorado, first granted

in 1939, was extended in 1951 with an appropriation of \$25,000 for use during the year beginning October 1955. This action brought to a total of \$280,480 the Foundation's contribution toward the council's long-range study of human growth and development. Under the direction of Dr. Alfred H. Washburn, steady progress has been made toward the ultimate goal of defining normal growth and behavior patterns in the human being. Close to 100 papers on the results of the cooperative investigations by the staff of physicians, psychologists, biochemists, social workers and other specialists have been published, and plans have been made to collate the principal findings in monograph form during the next few years.

THE SCIENCE OF BEHAVIOR

ROSCOE B. JACKSON MEMORIAL LABORATORY

Genetic Psychology

For the last six years the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Maine, aided by grants from The Rockefeller Foundation, has been conducting a study of the genetic aspects of behavior, with dogs as the primary experimental subjects. As a result of this work it has been demonstrated that different strains of dogs exhibit differences in speed of learning, in presence and intensity of emotional reactions to specific stimuli and in degree of dependency on other dogs. In other words, the effect of the environment is not uniform, but is influenced by factors operating within the animals. What are these factors that mediate the effect, as expressed in behavior, of a given stimulus on a given species of

animal? It is not enough to say that such factors represent basic differences in the make-up of the animals. It is important to find out how these differences in make-up are produced.

At Bar Harbor a genetic explanation is being sought through a crossbreeding program that should bring to light the hereditary mechanisms underlying variations in canine behavior from strain to strain. A program such as this, which can ultimately help show what is behind dissimilarities in human behavior, requires a considerable span of time in order to realize its full potentialities. The Foundation therefore has extended for another year its present support of \$50,000 annually; a 1951 appropriation of \$50,000 assures Foundation assistance to the genetic research program at the Jackson Memorial Laboratory through the end of February 1954.

YERKES LABORATORIES OF PRIMATE BIOLOGY

Rockefeller Foundation assistance for the Yerkes Laboratories of Primate Biology began in 1925 with a grant to Yale University for anthropoid research. Since then the Foundation has provided over one million dollars for support and development of the laboratories, which are located in Orange Park, Florida. Current Foundation aid in the form of a forward contribution of \$40,000 a year toward the general budget of the laboratories was extended in 1951 with a \$40,000 appropriation for use during the year beginning July 1, 1954.

The laboratories, now under the joint sponsorship of Harvard University and Yale University, were

established like those at Bar Harbor on the basic premise that study of a controlled subhuman group (mostly chimpanzees in this case) could do much to further the understanding of human behavior. The present program, directed by Dr. Karl S. Lashley, a distinguished experimental psychologist, is proceeding along four main lines: continued study of behavioral development; research on motivation, interest and attitude in adult animals; investigation of social interaction in animal groups; and studies on birth injuries.

HARVARD UNIVERSITY

Physiology of Behavior Patterns

The Laboratory of Social Relations at Harvard University was established in 1947 to promote cooperative research on problems of human behavior. Its program includes both experimental investigation on fundamental aspects of behavior (such as learning, memory and perception) and field studies of complex social relationships. A prominent feature of the laboratory's approach to the study of human relations is its attempt to bridge the gap between physiological psychology on the one hand and personality and social psychology on the other.

In 1951 The Rockefeller Foundation appropriated the sum of \$75,000, available for a five-year period, to Harvard University to assist a research program dealing with the physiological aspects of the development of behavior patterns. The program is carried out by Dr. Richard L. Solomon, associate director of the Laboratory of Social Relations, in collaboration

with Dr. Lyman C. Wynne and Dr. John M. Whiting. Its central aim is to work out on animals, in this case dogs, the basic means by which the nervous system elaborates durable patterns of response to environmental changes.

The current investigations represent an extension of earlier studies of "conditioned avoidance" reactions conducted by Dr. Solomon under a grant in aid from the Foundation. In conditioned avoidance reactions an animal learns to avoid a painful stimulus by responding to an associated innocuous stimulus toward which an anxiety state is built up. Once learned, avoidance reactions are almost impossible to extinguish, in contrast to the ordinary Pavlovian conditioned reflex, which can be eliminated without too much difficulty. The group at Harvard found that some dogs would accept "punishment" as many as 200 times rather than remain in the presence of a signal that had previously warned them of an impending unpleasant experience. The development of anxiety was shown to depend in part on a self-reexciting circle of activity which involves the sympathetic as well as the central nervous system. In other words, once a mild fear state is set up it produces physiological effects, such as an increased heart rate and constriction of blood vessels, and these sympathetic nervous system responses seem to serve as additional stimuli capable of increasing the central nervous system anxiety. The anxiety in turn may be the factor responsible for reinforcing the avoidance response and for preventing the obliteration of avoidance learning.

As part of their program Dr. Solomon and his colleagues are exploring the possibilities of modifying these avoidance behavior patterns by various operative procedures. Also being tested is the effect of different social environments on the persistence of avoidance reactions. Closely allied to this work on anxiety and avoidance learning are investigations of abnormal behavior patterns and the production of emotional states akin to human guilt feelings.

While information obtained with animals obviously cannot be applied directly to human beings, animal behavior patterns are enough alike to justify a working hypothesis that the basic principles of behavior throughout the animal series are similar. The durability of avoidance reactions in dogs and their resistance to "unlearning" or to any form of "therapy," for example, resemble strikingly some of the phobias that occur in human beings.

McGILL UNIVERSITY

Perception and Learning

McGill University, Montreal, in 1951 received a three-year grant of \$30,000 from The Rockefeller Foundation for research on the physiological basis of behavior under the direction of Professor Donald O. Hebb. Dr. Hebb, who is chairman of the university's Department of Psychology, has been engaged for many years in the study of the neurological events underlying the phenomena of learning, perception, memory and emotional expression, with the aim of developing a general theory of behavior founded on nervous system function.

Because perception and learning underlie many of the other more complicated elements of behavior, understanding of these two almost inseparable phenomena is indispensable to the formulation of such a theory. Whereas the studies at Harvard described above are concerned with the mechanisms of avoidance reactions, Dr. Hebb's group is endeavoring to account for the persistence of positive, learned responses to particular stimuli. The conditioned reflex theory of pathways in the nervous tissue works very well with relatively simple stimuli such as the ringing of a bell or the flashing of a light. Difficulty arises, however, with more complicated or abstract stimuli: for example, an animal conditioned to respond to a circle responds to two-inch circles as well as to four-inch circles despite the obvious difference in the nerve cells that are excited. In other words, the animal responds to circularity, an abstraction.

Considerations such as these imply that perception may not be the simple, immediate phenomenon that it seems by introspection, an idea now being tested by the group at McGill. Working with rats and dogs, Dr. Hebb and his colleagues are analyzing the process of perception into a series of subprocesses which Dr. Hebb terms "phase sequences." According to this theory, phase sequences learned early in life remain available to be put together into more complex perceptions and concepts later on as the occasion arises.

The nonunitary nature of perception is supported by observations on human behavior. Persons relieved by operation from congenital blindness are found to require months to learn to recognize the simplest visual

patterns, even though they "see" them as soon as vision is restored. This has been confirmed under experimental conditions in animals, and at present Dr. Hebb and his group are giving particular attention to the way in which early experience provides the animal with the mechanisms which are later integrated into perceptions, concepts and general intelligence. The influence of genetic variability in this process is also being studied.

It is interesting that the experimental analysis of perception and learning has substantiated in at least one important respect the conclusions drawn from clinical experience with neurotic patients — the first few years of life are critically significant for later development of the personality. It is hoped that further analysis of perception and learning will bring these two basic functions together in a self-consistent scheme and thereby lead to better understanding of the phenomena of attention, expectancy and psychic conflict or breakdown.

PRINCETON UNIVERSITY

Psychology of Perception

Another 1951 Rockefeller Foundation grant in support of perception studies was in the amount of \$25,000 to Princeton University. This renews previous Foundation aid amounting to \$95,000 since 1948 for research conducted in the Department of Psychology in collaboration with Professor Adelbert Ames, Jr., of the Institute for Associated Research, Hanover, New Hampshire. This work is a direct outgrowth of earlier basic studies in visual perception

carried out by Professor Ames before his retirement from the faculty of Dartmouth College. Professor Ames's original research, which also received assistance from the Foundation, focused on space perception. In the present Princeton-Hanover program, the research emphasis is upon factors involved in the perception of movement, particularly the extent to which past experience enters into the ability to perceive the objective world in motion.

NATIONAL RESEARCH COUNCIL

Committee for Research in Problems of Sex

The Committee for Research in Problems of Sex of the National Research Council has for the past 26 years been seeking out and supporting a wide variety of carefully selected projects in research on reproduction. Present knowledge of the basic role of the endocrine factors in reproductive physiology derives in large part from work supported by the committee. This knowledge in turn is serving as background for studies of the more complex behavioral and emotional aspects of sexual behavior in lower animals and man.

The committee is now concentrating on two major interests. The first of these is its program of grants to investigators in universities throughout the country for research on such subjects as the neural and hormonal basis of vertebrate sexual behavior; the biology of sexual differentiation in protozoa; the physiologic action of the hormone progesterone in human subjects; the mechanism of sexual development in bees with both male and female characteristics; and the physiology of the oviduct, of fertilization

and of embryonic implantation in mammals. The other main interest of the committee is in the work of Dr. Alfred C. Kinsey and his colleagues at the Institute for Sex Research at Indiana University. The first volume based on the behavioral studies carried out by this group was *Sexual Behavior in the Human Male*; the second volume, *Sexual Behavior in the Human Female*, is scheduled for publication at an early date; and the third volume, on the legal aspects of sexual behavior and aimed primarily at lawyers, administrators of penal institutions and legislative committees, is now in preparation.

Rockefeller Foundation assistance to the Committee for Research in Problems of Sex began in 1931; a current grant provides support at a rate of \$80,000 a year through the middle of 1952. This aid was continued in 1951 with an appropriation of \$160,000 for the following two years. As in prior years, 50 per cent of these funds is for the support of the group under Dr. Kinsey at the Indiana institute and 40 per cent is toward support of the several smaller research projects, with the remaining 10 per cent for general administrative purposes.

PHYSIOLOGICAL STUDIES

UNIVERSITY OF OSLO

Respiratory Physiology

The University of Oslo in 1951 received a three-year appropriation of \$19,500 from The Rockefeller Foundation to help establish a research laboratory of respiratory physiology. Modern surgical treatment

of thoracic lesions requires accurate, reliable and objective methods of determining the patient's pulmonary function as well as his circulatory status. Before such methods can be made available, there must be clearer and more detailed knowledge of pulmonary physiology.

The director of the Oslo laboratory is Dr. Carl Semb, professor of surgery, who has a special interest in thoracic, cardiac and respiratory surgery. The laboratory has been set up at the Ullevål Hospital, one of the largest teaching hospitals in Oslo and recently officially recognized as a university affiliate. The large number of patients at the hospital will make it possible for Professor Semb and his co-workers to have adequate groups both of subjects with lung ailments and of subjects with normal pulmonary function. At present the major part of the work consists of studies that will refine existing methods for measuring the respiratory and circulatory processes. This program, which it is hoped to expand later to include the development of new experimental techniques, receives support from the Norwegian National Research Council and from industrial firms interested in respiratory research, as well as from the Foundation.

UNIVERSITY OF ILLINOIS

Brain Chemistry

Research in neurochemistry was aided by The Rockefeller Foundation in 1951 through a three-year grant of \$24,000 to the University of Illinois for work under the direction of Dr. James A. Bain. Dr. Bain, who is a biochemist, teaches pharmacology to students

at the university's College of Medicine. The major portion of his time, however, is spent at the university-affiliated Illinois Neuropsychiatric Institute, where he supervises the training of several graduate students and conducts an active research program in the basic cellular metabolism of the brain.

The principal focus of this program is the metabolism of the brain in epilepsy. Electroencephalography has revealed that in the course of an epileptic fit the electrical activity of the brain increases. Dr. Bain is working on the chemical events that may underlie or accompany this heightened activity. The main sources of energy for chemical transformations in nerve and muscle cells are what are known as the phosphate bonds, or linkages, within highly complex organic constituents of the cells. As a result of several series of preliminary experiments, Dr. Bain and his group are now concentrating their attention on the process which triggers the breakdown of these phosphate bonds, thereby releasing their energy. Work is also going forward on the metabolic effect of new drugs whose anticonvulsant properties may make them useful in the clinical treatment of epilepsy.

NEW YORK UNIVERSITY

Rehabilitation of Neurological Patients

Interest in the rehabilitation of persons handicapped by the loss or paralysis of one or more extremities was greatly stimulated by World War II. Once aroused, this interest spread naturally to include rehabilitation of persons incapacitated by disease of the nervous system, which often produces the same

kind of disability that injury does. The whole concept of rehabilitation took firm root as medical workers, social workers and lay persons alike realized that to stop the ravages of disabling disease the patient must be started on a new road toward self-sufficiency.

In 1947 New York University established the Institute of Physical Medicine and Rehabilitation with the specific aim of helping those whom disease of the nervous system had incapacitated to overcome their handicaps. In the five years of its existence the institute, which is headed by Dr. Howard Rusk, former director of the Air Force rehabilitation program, has become a prominent center of public and professional interest in rehabilitation. It recently moved into new and specially constructed quarters, with about 80 in-patient beds and a large variety of treatment rooms. Undergraduate students from the university's medical school here have a first-hand opportunity to observe what new attitudes and new therapeutic procedures can accomplish in rehabilitating the handicapped. Advanced training in rehabilitation is provided for four resident physicians.

In addition to carrying on its clinical services, which are now on a self-supporting basis, the institute is also at work on a number of research projects. Among the most significant of these is the program now being conducted jointly by the institute and the university's Department of Neurology, of which Dr. S. Bernard Wortis is chairman. The objective of the study is to adapt procedures developed for the rehabilitation of persons handicapped through trauma to the treatment of chronic degenerative diseases of

the nervous system. The problem of rehabilitating the neurologically disabled is more complicated than the task of rehabilitating the injured, since most neurological diseases tend to be progressive. This means that the patient must be helped to adjust to a worsening situation and enabled to function adequately as long as possible. Rehabilitation techniques should therefore ideally be integrated with therapeutic methods directed at slowing down or halting the disease itself.

This consideration has led the joint research unit to undertake a broad program of study which includes both rehabilitation per se and a comprehensive investigation of the physiological and metabolic disturbances underlying the major neurological diseases. Through this approach it is hoped both to advance the scientific basis of rehabilitation and to demonstrate how a well-integrated rehabilitation program can restore increased numbers of the "helpless" to a reasonably normal, productive and happy life. The Rockefeller Foundation, with whose assistance the project was initiated in 1949, this year allocated the sum of \$85,320 to New York University for support of the work over an additional five-year period.

BRITISH MEDICAL RESEARCH COUNCIL

National Institute for Medical Research

The central laboratory for all of Great Britain for research in fundamental problems of biochemistry, physiology, pharmacology and other basic medical sciences is the National Institute for Medical Research at Mill Hill, London. Its director is Sir Charles

Harington, who serves also as head of the Division of Biochemistry. The British Medical Research Council sponsors the institute, and the British government has furnished funds for most of the large array of modern equipment needed by the institute. This equipment is now complete except for two major pieces of apparatus currently unavailable in Great Britain. In order to permit the institute to acquire these essential research tools, The Rockefeller Foundation in 1951 made a grant of \$38,000 to the British Medical Research Council.

The two instruments in question, which are to be purchased in the United States, are an ultracentrifuge and an infrared spectrophotometer with accessories. Both will be at the disposal of all departments of the institute for use in a variety of different projects, including study of the molecular structure of an iodine-containing component of the blood other than thyroxine, investigation of the different growth forms of viruses and work on a number of problems in the field of biophysics.

PROMOTION OF HEALTH SERVICES

IRAN

Rural Health Demonstration and Training Area

As reported in the 1950 Annual Report of the International Health Division of The Rockefeller Foundation, a local health service was set up in Iran as a cooperative project of the Foundation, the Ministry of Health of the Iranian government and the Medical Faculty of the University of Tehran. Early in 1951



Photograph Excised Here

Apparatus for determining catalytic activity of soils in the decomposition of DDT



Drainage ditching in the malaria control campaign, Mysore State, India

Photograph Excised Here



Photograph Excised Here

Research in neurophysiology, University of Pisa

Air view of village in Iran; "bomb craters" are part of the water supply system



Photograph Excised Here

a grant of \$15,000 was made by the Foundation in support of this work. The Foundation has since withdrawn from the program, which has been taken over by American Point Four authorities.

The rural health agency was set up in the village of Robotkarim, roughly 25 miles from Tehran. This agency served as a demonstration project for an area comprising three districts with a population of approximately 70,000. Training of public health personnel and instruction in the practical aspects of preventive medicine were primary objectives. Data were collected on the prevalence of certain manifest diseases, on habits relating to personal hygiene, on environmental sanitation, on infant mortality and on average annual birth and fertility rates. It is hoped that this information, some of it collected for the first time, will prove valuable in the course of future public health work in Iran.

CHILE

Aconcagua Rural Health and Nutrition Service

Another Foundation-supported local health project is the rural health and nutrition service of the Province of Aconcagua, Chile. This service was started four years ago in the Department of San Felipe to serve as a training center for rural health activities and as an experiment in a voluntary coordination of efforts by the various government medical care and health agencies. Government participation in this project was increased from one to four million pesos during the year to allow extension of the program to the remaining two departments of the province. In 1951

The Rockefeller Foundation made a grant of \$20,250 for further support of the service.

The agriculture-nutrition program, conducted in cooperation with the Ministry of Agriculture, continues to grow and gain national attention. Its purpose is to raise farm production and improve the nutrition habits of the farm workers. While climatic and soil conditions in Aconcagua make this province one of the richest farming regions of Chile, production is not as high as it might be; moreover, since most of the produce is shipped to the cities of Santiago and Valparaiso, the provincial people frequently have had to buy meat and vegetables elsewhere at a high price. Through a community program in which the farmers and their families are actively participating, hundreds of home vegetable gardens have been started. Demonstration agents give instruction in scientific cultivation methods, animal husbandry, modern food preparation, preserving and sewing. The teen-agers belong to clubs of their own; they plant their own gardens, raise rabbits, chickens or pigs and learn how to can surplus food. The local committees of farmers, which meet informally once a month, are well attended.

In the past year the maternal and infant care program of the health service was strengthened by the addition to the staff of a full-time pediatrician. New well-baby clinics were established, bringing the total of these clinics to seven. The 2,000 infants, 1,600 pre-school children and 300 pregnant women now being served by these units represent, respectively, about 75 per cent of the infants in the Department of San

Felipe, 30 per cent of the preschool children and 40 per cent of the pregnant women.

Continuing its campaign against communicable disease, the health service in 1951 vaccinated 9,000 persons against diphtheria and 2,000 children against whooping cough and diphtheria. Over 10,000 persons or approximately half of the susceptible population of San Felipe were immunized with BCG. This anti-tuberculosis program has been extended to the Departments of Los Andes and Petorca.

CHILE

Sanitary Engineering

The National Department of Sanitary Engineering in Chile has been granted \$22,500 for the continuation during 1952 of its developmental program in sanitary engineering. Active support has been given to this program by related government services and the University of Chile. Outside agencies such as the Pan American Sanitary Bureau and the Institute of Inter-American Affairs are also collaborating in an effective manner. The program has received Foundation aid since 1950 and at the present time is under the general supervision of a member of the Foundation's field staff who serves as technical adviser to the Chilean National Health Service.

The sanitary engineering program has already resulted in coordinated sanitation control and a rapid extension of services. Environmental sanitation programs have been set up in all but the three southernmost provinces of the 24 provinces of Chile. By the end of the year, 25 engineers and numerous auxiliary

personnel were giving full time to environmental sanitation and industrial hygiene. Direct sanitary control of major water supplies has been established throughout the country. Garbage collection and disposal methods have been improved. Water and sewerage systems have been extended and increased in number, benefiting several thousand people and helping to develop a sense of local responsibility in the rural communities.

An important phase of the department's work is the selection and training of engineers and inspectors. The new services have created a pressing need for professional training to reach the large group of engineers responsible for the design, construction and operation of water and sewerage systems. Several members of the industrial hygiene staff have had an opportunity to take postgraduate courses in the United States and will receive technical guidance in their work from a consultant appointed by the Institute of Inter-American Affairs. By arrangement with the University of Chile, the School of Public Health, in collaboration with the School of Engineering, gave a short course for engineers. Undergraduate courses in municipal engineering and industrial hygiene were also offered during the year. To help the School of Public Health meet these new demands, The Rockefeller Foundation in 1951 made a grant in aid of \$4,000.

This school was established in 1944 through the cooperative efforts of the National Department of Health, the University of Chile, the Bacteriological Institute and The Rockefeller Foundation. In its

first seven years it has been successful in training personnel not only for Chile but also for other South American countries. It was recently selected as an international training center for sanitation personnel by the Pan American Sanitary Bureau.

SMALL APPROPRIATIONS

Eight small appropriations, ranging from \$6,000 to \$12,750, made by The Rockefeller Foundation in the field of public health and medicine during 1951 are described briefly below.

UNIVERSITY OF MELBOURNE

The sum of \$6,000 was made available to the University of Melbourne for the purchase of equipment and supplies for its Department of Physiology. This department is one of the important centers in Australia for teaching and research in the basic medical sciences. Its research activities center mainly on the physiology of the digestive tract, with emphasis on the mechanisms of gastrointestinal secretion and absorption. This work requires specialized equipment which at present is unobtainable in Australia and is difficult to purchase abroad because of current trade restrictions. Since 1948 The Rockefeller Foundation has been assisting the university in overcoming this difficulty. The 1951 grant will continue the assistance for another three years.

CATHOLIC UNIVERSITY OF CHILE

An appropriation of \$7,500 was made by The Rockefeller Foundation in 1951 to assist in the

development of medical education and research at the Medical School of the Catholic University of Chile, Santiago. This grant will provide assistance for the work of Professor Hector Croxatto, head of the Department of Physiology, of Professor Joaquin V. Luco, head of the Department of Neurophysiology, and of Professor Luis Vargas, head of the Department of Physiopathology.

WALTER AND ELIZA HALL INSTITUTE OF
MEDICAL RESEARCH, AUSTRALIA

The Walter and Eliza Hall Institute of Medical Research, Melbourne, is one of the few internationally known research organizations in Australasia. The major activity of the institute is basic research on the nature of viruses. During the past year a study was made of the encephalitis outbreak in the Murray Valley. Currently, the institute is investigating the mosquito *Culex apiculorostri* as a possible vector of the encephalitis virus.

The expenses of the Walter and Eliza Hall Institute are met chiefly by income from endowments and by grants from the Australian National Health and Medical Research Council. The Rockefeller Foundation in 1951 appropriated \$8,300 to the institute to be used for purchasing research equipment.

UNIVERSITY OF OSLO

Because of their relatively stable populations and the advanced state of their public health methodology, the Scandinavian countries offer excellent opportunities for the statistical study of disease. An

example of such work in the field of psychiatry is the program conducted by Dr. Ørnulv Ødegard, professor of psychiatry at the University of Oslo and director of the Gaustad Mental Hospital. Dr. Ødegard has devoted his research efforts for the last few years to studies of the incidence of mental disease among the relatives of 250 hospitalized psychotics. He has also prepared a national register of the 40,000 individuals admitted to psychiatric hospitals in Norway during the period 1916-1947. In order to permit continuation and expansion of the work under the direction of Dr. Ødegard, The Rockefeller Foundation in 1951 appropriated \$9,000, available until the middle of 1954, to the University of Oslo.

JAPANESE MEDICAL SCHOOLS

The postwar recovery of Japanese medical education has been handicapped by lack of current journals and medical books from abroad. In 1949 The Rockefeller Foundation set aside the sum of \$30,000 to provide such materials, and today the supply of books is fairly adequate. Since currency restrictions still impede the normal purchasing activities of the schools, the Foundation in 1951 allocated another \$10,000, available for one year, to meet the continuing need for journals. As in the case of the 1949 appropriation, the distribution will be supervised by the Japanese Council on Medical Education.

TULANE UNIVERSITY

The Foundation has made an appropriation of \$10,000 to Tulane University for research connected

with its law-science program. The purpose of this program is to improve the usefulness of scientific evidence in deciding legal questions and to aid in building a discipline of forensic medicine through which modern scientific knowledge of behavior can be applied to the problem of crime. Under the direction of Dr. Hubert Winston Smith, the work has been proceeding along three principal lines: the education of medical students and physicians in regard to their legal rights and obligations; the improvement of methods for obtaining medical evidence in crimes of violence; and the development among lawyers of an understanding of the ways in which the social and natural sciences can contribute to the formulation of new laws and administrative procedures.

UNIVERSITY OF PISA

By means of a 1951 appropriation of \$10,900 available for three years to the University of Pisa, The Rockefeller Foundation is providing support for the neurophysiological research program of Dr. Giuseppe Moruzzi, a former Foundation fellow and the present director of the Physiology Department.

There are three major facets to Professor Moruzzi's program: research work, which at present deals mainly with impulses deriving from the olfactory center of the brain and with the physiology of the cerebellum; provision of laboratory training for students from all over Italy and also from abroad; and a third phase into which enter both research and training — Professor Moruzzi's interest in linking physiology with anatomy and with physics. With the

latter interest in mind, Professor Moruzzi is establishing three-year postgraduate research fellowships for three young Italian scientists, one in neuroanatomy, one in neurophysiology and one in biophysics. The fellows are to devote their full time to research and to helping to train graduate students in the department.

UNIVERSITY OF UTRECHT

A Rockefeller Foundation appropriation of \$12,750, available for three years, was made in 1951 to the University of Utrecht, Netherlands, for support of teaching and research at the Institute of Clinical and Industrial Psychology. The principal purpose of the institute is to advance the discipline of applied psychology in the Netherlands and to help meet the demands of industry for psychological services and techniques.

GRANTS IN AID

From funds set aside for grants in aid in medical sciences and public health, allotments made during 1951 amounted to \$370,545.54. A total of 116 different projects received grants.

Fifty-four grants were chiefly for research projects and 62 were travel grants. The 116 grants aided workers in 30 different countries.

The research grants covered such expenses as salaries for research and technical assistants, research equipment and supplies, and miscellaneous expenses relating to research programs.

Travel grants are provided to enable mature research workers or teachers to visit other countries or other laboratories or schools in their own countries, where they work, observe and consult with colleagues for varying brief periods of time. The large number of grants for visits in 1951 reflects the continued postwar curiosity of scientists about developments in their fields and their desire to widen contacts with their colleagues. Thirty-seven of these travel grants were for visits of persons from foreign countries, either to the United States or to both the United States and Canada; 12 for visits from one foreign country to another; 4 for study or observation in the same country; and 9 for visits of workers in the United States to other countries. Fields of interest included under public health and preventive medicine were public health administration, public health nursing, sanitary engineering, malaria, tuberculosis and plague control, the use of insecticides and rodenticides, the study of bacterial toxins and the training of sanitary inspectors. The interests of other visitors were in medical education; psychiatry, neurology and related fields; microbiology; thoracic and heart surgery; pharmacology; endemic goiter; social medicine and medical care; and other medical subjects.

The travel grants in some cases provided traveling expenses to and from a country and living expenses in the country visited. In other cases, when part of the expenses were provided from some other source, only traveling expenses between the two countries or traveling and living expenses within the country visited were provided.

The following list gives a brief description of the individual grants.

ARGENTINA

Dr. Miguel Covian, Institute of Biology and Experimental Medicine, Buenos Aires; \$6,500 for equipment for neuro-physiological research

BOLIVIA

Division of Rural Endemic Diseases; \$10,000 for general budget support

BRAZIL

Araraquara Rural Health Training Center, State of São Paulo; \$10,000 for general budget support and purchase of equipment for nutrition program

CANADA

University of Saskatchewan; \$10,000 to provide funds so that the university could allow Dr. Wendell Macleod to study problems of medical education and visit various medical schools in the United States

CHILE

Catholic University of Chile, Santiago; \$850 for equipment for Professor Hector Croxatto in Department of Physiology

Rural Health and Nutrition Service, Aconcagua; \$3,500

University of Chile, Santiago:

Faculty of Medicine:

Department of Pediatrics; under direction of Dr. Herman Niemeyer, \$5,000 for equipment

Institute of Experimental Physiology; under direction of Dr. Francisco Hoffman, \$7,500 for equipment and running expenses

School of Public Health; \$4,000 for additional training courses

Sección "A" de Medicina del Hospital del Salvador; \$7,500 for apparatus and expenses of the department of medicine under direction of Dr. Hernan Alessandri

Work of Mr. Alberto Villalón, medical librarian; \$9,600

DOMINICAN REPUBLIC

Endemic Disease Control Service; in cooperation with Dominican government, \$3,000

FRANCE

Association pour la Santé mentale de l'Enfance, Paris; not more than 480,000 francs, approximately \$1,440, for the salaries of Mlle Marcelle Geber and Mlle Anne-Marie Schoendoerffer

University of Lyon; 1,440,000 francs, approximately \$4,320, for assistance to Agrégé Michel Berger, Department of Biological Physics, Radiology and Physiotherapy, Faculty of Medicine

University of Marseille; up to 2,000,000 francs, approximately \$6,000, for apparatus for use of Dr. Georges Morin, Laboratory of Physiology, Faculty of Medicine

University of Paris:

Institute for Cancer Research; 400,000 francs, approximately \$1,200, for assistance to Professor Charles Oberling

Laboratory of Experimental Neurophysiology, Hospice de la Salpêtrière; under direction of Professor Th. Alajouanine, \$1,575 for equipment for use of Dr. Jean Scherrer

University of Strasbourg, Laboratory of Applied Physiology; \$3,800 for equipment for use of Dr. Bernard G. M. C. Metz

University of Toulouse, Laboratory of Physiology, Faculty of Medicine; \$1,375 for apparatus for use of Dr. Yves Laport

GERMANY

University of Heidelberg, Physiological Institute; under direction of Professor Hans Schaefer, \$3,000 for equipment and running expenses

University of Würzburg, University Neurological Clinic and Polyclinic; up to 2,000 DM, approximately \$500, for technical assistance and supplies

GREAT BRITAIN

St. Thomas' Hospital Medical School, London, England; \$825 toward equipment for use of Professor Henry Barcroft and colleagues in Sherrington School of Physiology

University College, London, England; £500, approximately \$1,500, for equipment for use of Dr. Johnson Abercrombie, Department of Anatomy, for study of teaching methods

INDIA

King George Medical College, University of Lucknow, Department of Physiology; £534, approximately \$1,600, for apparatus for the use of Dr. Autar S. Paintal

Medical College, Department of Anatomy, Amritsar, Punjab; \$3,500 for equipment for Dr. Ramji Dass

Mysore State:

Anemia studies in cooperation with Mysore Health Department; \$3,500

Malaria studies and control demonstration in cooperation with Mysore Health Department; \$8,354

Virus investigations; \$10,000 for purchase of equipment for projected virus studies

Dr. B. K. Anand; \$3,645 for equipment for work in neurology at the Medical College, Amritsar, Punjab, or such other institution as the Indian Council on Medical Research may approve

ITALY

Second European Seminar for Sanitary Engineers, Rome; \$2,250 for traveling expenses of Professor Gordon M. Fair of Harvard University and ten young Italian engineers who attended the seminar held November 12 to 17, 1951

University of Florence, Institute of Pharmacology; \$3,775 for apparatus for use of Dr. Alberto Giotti

University of Naples:

Departments of General Biology and Human Genetics; 6,000,000 lire, approximately \$10,000, for research under direction of Professor Giuseppe Montalenti

Institute of Genetics; 2,000,000 lire, approximately \$3,334, for genetic study on microcythaemia by Professor E. Silvestroni and Dr. I. Bianco under the direction of Professor Giuseppe Montalenti

University of Turin, Neurological Clinic; \$1,000 for equipment for use of Dr. Cosimo A. Marsan

JAPAN

Imperial University of Tokyo, School of Medicine; \$9,200 for equipment, books and supplies, and repair of equipment, under direction of Dr. Kentaro Shimizu, Department of Surgery

Institute of Public Health, Tokyo; \$2,500 for health and demographic study in Japan by the Department of Public Health Demography

Nagoya University Medical School; \$7,000 for establishment of training center in psychiatry under the direction of Dr. Tsuneo Muramatsu

LEBANON

American University of Beirut, School of Medicine, Department of Histology; \$2,500 for research aid

MEXICO

Hospital for Nutritional Diseases, Mexico, D.F.; \$2,750 for equipment for Dr. José Laguna

National University of Mexico, Laboratory of Medical and Biological Studies, Mexico, D.F.; \$2,700 for apparatus for studies of Dr. Efren C. del Pozo in problems of neuromuscular transmission

Studies on control of insect vectors; 32,400 pesos, approximately \$3,910, in addition to previous grants, during 1951 and 1952

SARDINIA

Public health program in 1951; 3,100,000 lire, approximately \$5,170

SWEDEN

University of Lund, Laboratory of Mycology, Department of Internal Medicine; \$9,500 for equipment for use of Dr. Ake Norden

SWITZERLAND

University of Basel, Institute of Hygiene and Bacteriology; \$2,400 for salary of assistant to Professor Joseph Tomcsik

TOBAGO, BRITISH WEST INDIES

Malaria and anopheline control; in cooperation with the government, to provide up to BWI \$9,000, approximately \$5,400

UGANDA, EAST AFRICA

Makerere College Medical School, Kampala; \$2,850 for apparatus for Department of Biochemistry under direction of Dr. Eric G. Holmes

UNION OF SOUTH AFRICA

University of Natal, Durban; up to £1,980, approximately \$5,940, to supplement salary of the dean of the medical school for native students

UNITED STATES

Columbia University, New York; \$9,600 for research in genetics of nervous and mental disease under direction of Dr. Franz J. Kallmann

Maryland State Planning Commission; \$7,425 for assistance to the Maryland Committee on Medical Care in carrying out studies and surveys on medical care problems in Maryland

National Fund for Medical Education, New York; \$10,000 for administrative expenses

National Research Council, Washington, D. C.; \$1,500 to aid Medical Fellowship Board's survey of fellowships

New York State Psychiatric Institute, New York; \$7,500 for investigation of visual critical flicker-fusion threshold

University of Michigan, School of Public Health, Ann Arbor; \$8,500 for the Bureau of Public Health Economics

Sum of \$7,000 for fund for grants of small amounts for equipment, consumable supplies, travel and miscellaneous purposes, allotted under supervision of the Director of the Division

TRAVEL GRANTS

ANGLO-EGYPTIAN SUDAN

Dr. Willoughby Hugh Greany, provincial medical inspector, Blue Nile Province; \$2,400 for a visit to observe public health administration in the United States and Canada

AUSTRALIA

Dr. A. D. Packer, Department of Anatomy, Faculty of Medicine, University of Adelaide; \$600 for expenses while in the United States and Canada to visit selected medical schools

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Dr. Gilbert E. Philips, lecturer in neurology, University of Sydney Medical School; \$600 for expenses while working at neurological centers in Europe, and possibly the United States

BOLIVIA

Dr. Victor Lora Ponce, Division of Rural Endemic Diseases; \$600 for expenses of attending course of training in use of insecticides at the Institute of Malariology, Brazil

Dr. Roberto Marzana, chief, Plague Service, Division of Rural Endemic Diseases; \$1,150 for expenses of studying organization of plague control in Brazil

Dr. Nemesio Torres-Muñoz, director, Division of Rural Endemic Diseases; \$2,400 for a trip to the United States to observe public health work

BRAZIL

Dr. Helvecio Brandão, Faculty of Hygiene and Public Health, University of São Paulo; \$850 for traveling expenses to and from United States for course in public health

CANADA

Mr. Joachim Henry Horowicz, Department of National Health and Welfare, Ottawa; \$800 for a visit to United States to observe methods of medical care

Dr. Gordon Edward Wride, Department of National Health and Welfare, Ottawa; \$1,000 for visit to health departments and institutions providing medical care in the United States

Dr. John Wylie, professor of preventive medicine, Queen's University, Kingston, Ontario; \$600 for expenses of observing teaching of preventive medicine and other activities in institutions in England and Scotland while representing Queen's University at 500th anniversary of the University of Glasgow

CHILE

Mr. Alberto Villalón, Medical School Library, University of Chile, Santiago; \$1,450 for library studies in United States

DENMARK

Mrs. Inga Scheibel, head, Department of Immunology, State Serum Institute, Copenhagen; \$2,700 for visit to United States and Canada to observe methods of research with relation to bacterial toxins

EL SALVADOR

Dr. Alirio Menjivar, Health Department; \$500 for visit to observe training of sanitary inspectors in Jamaica

Dr. José Domingo Sosa-Orellana, chief sanitary inspector, Health Department; \$500 for visit to observe training of sanitary inspectors in Jamaica

FINLAND

Dr. Martti Kaila, professor of psychiatry, University of Helsinki; \$2,200 for three-month trip to the United States and Canada to observe modern methods of teaching and research in psychiatry

FRANCE

Dr. Lucien Viborel, director, Centre national d'Éducation sanitaire, démographique et sociale, Paris; \$2,100 for visit to schools of public health in the United States

GERMANY

Dr. Richard Jung, professor of clinical neurophysiology and psychiatry, University of Freiburg; \$2,200 for visit to the United States and Canada

Professor Alexander Mitscherlich, director, Institute of Psychosomatic Medicine, University of Heidelberg; \$2,450 for visit to the United States and Canada

GREAT BRITAIN

Professor Robert Cruickshank, Wright-Fleming Institute of Microbiology, St. Mary's Hospital Medical School, London, England; \$1,500 for visit to medical centers in the United States and Canada

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Miss Elsa M. Goldberg, Medical Research Council, London, England; \$2,250 for visit to the United States and Canada to observe teaching and research in social and psychosomatic medicine

Miss Mabel Gordon Lawson, deputy chief nursing officer, Ministry of Health, London, England; \$1,700 for observation of nursing administration and nursing education in the United States

Mr. Thomas Laws Mackie, sanitary inspector, Port of London, England; \$250 for trip to the United States to investigate use of new rodenticides (in addition to previous grant)

Dr. Colin Fraser Brockington, professor of social medicine, University of Manchester, England; \$2,515 for visit to United States and Canada to observe work in his field

Professor Dugald Baird, obstetrics and gynecology, University of Aberdeen, Scotland, and Dr. May D. Baird, chairman, North-East of Scotland Regional Hospital Board; \$2,100 for visit to the United States and Canada

Dr. Charles Mann Fleming, principal medical officer of Department of Health for Scotland; \$2,400 for trip to observe medical care and medical education in the United States and Canada

Dr. Margaret M. Methven, director, Child Guidance Department, Royal Hospital for Sick Children, Edinburgh, Scotland; \$2,250 for visit to United States to observe centers of child guidance work

Professor William Malcolm Millar, Department of Mental Health, University of Aberdeen, Scotland; \$2,100 for visit to study methods of teaching and care of patients in America

Dr. Richard Scott, University of Edinburgh, Scotland; \$2,370 for visit to the United States and Canada to observe teaching of preventive medicine and development of group practice

Dr. John Greenwood Wilson, medical officer of health, Cardiff, Wales; \$900 for expenses of observing public health work while in the United States to attend meeting of the American Public Health Association

ICELAND

Dr. Oli P. Hjaltested, medical director, Tuberculosis Clinic, Municipal Health Center, Reykjavik; \$2,000 for visit to observe tuberculosis control measures in the United States

INDIA

Mrs. A. Rukmini Amma, School of Nursing, Trivandrum; \$140 to study improvements in basic nursing courses at Vellore Medical College School of Nursing

Dr. Dharmavadani Krishnier Viswanathan, Bombay State; \$400 for visit to Malaria Institute, Delhi, and malaria control work in other parts of India and in Ceylon

Jaswant Singh, director, Malaria Institute of India, Delhi; \$700 (in addition to previous grant for visit to United States) for trip to Venezuela and additional time in England on return to observe work on antimalarial drugs and insecticide testing

ITALY

Professor Maria E. Alessandrini, Superior Institute of Public Health, Rome; \$1,600 for extension of stay in the United States to observe methods of insect control

Professor Ferdinando Rossi, director, Institute of Normal Human Anatomy, University of Genoa; \$1,000 for visit to Sweden and Denmark to observe work in histochemistry and histology

JAPAN

Dr. Morio Yasuda, dean, Medical School, Hokkaido University; \$3,300 for visit to representative medical schools in the United States and Canada to help in planning new medical school buildings and modernizing teaching methods in Hokkaido

NETHERLANDS

Dr. Hermanus Marius Engelhard, Department for Mental Health, Institute of Preventive Medicine, Leiden; \$600 for visit to centers of mental health in England

Professor A. G. Brom, University of Leiden; \$1,950 for trip to study thoracic and heart surgery techniques in the United States and Canada

Professor Henri William Julius, director, Hygienic Laboratory, University of Utrecht; \$750 for expenses in the United States while observing chemotherapy of tuberculosis and work on bacterial enzymes

NEW ZEALAND

Professor J. C. Eccles, Physiology Department, University of Otago, Dunedin; \$1,000 for visits in the United States and Canada

Sir Charles E. Hercus, dean, Medical School, University of Otago, Dunedin; \$4,200 for visit to the United States and Canada to study recent developments in psychiatry, preventive medicine, child health, teaching in medical schools and care of the aged

NORWAY

Dr. Knut Engedal, chief health officer, Bergen; \$2,210 for visits to state and local health organizations in the United States

Dr. Ørnulv Ødegard, director, Gaustad Mental Hospital, Oslo; \$167.54 in addition to previous grant for visit to the United States and Canada

Dr. Erik Poppe, chief radiologist, University Hospital, Oslo; \$2,150 for visit to United States and Canada to study radiation biology

Dr. Carl Wilhelm Sem-Jacobsen, Gaustad Mental Hospital; \$2,650 to study hospital patients of Norwegian birth in the United States

SWEDEN

Dr. Lars Torsten Friberg, Department of Industrial Health, National Institute of Public Health, Stockholm; \$2,350 to observe occupational health in the United States and Canada

Professor Ragnar Granit, director, Nobel Institute for Neurophysiology, Karolinska Institute, Stockholm; \$1,380 for visit to the United States and Canada to observe work in neurophysiology

SWITZERLAND

Professor Hans Zellweger, chief of clinic, Children's Hospital, Zurich; \$2,350 for visit to the United States and Canada in preparation for accepting professorship of pediatrics at University of Beirut

Symposium on medical education; \$3,000 for expenses incurred by 19 representatives from medical faculties of ten European countries to symposium held at Vevey, Switzerland, in August 1951

YUGOSLAVIA

Professor Hrvoje Ivekovic, Faculty of Engineering, University of Zagreb; \$1,275 for visit to other European countries, including Great Britain, to study engineering methods of value to the teaching of sanitary engineering

Professor Nikola Paukovic, Faculty of Engineering, University of Zagreb; \$1,700 for visits to Great Britain, France, the Netherlands and Sweden to observe engineering methods bearing on the teaching of sanitary engineering

UNITED STATES

Dr. Luis Amador, Department of Neurology and Neurological Surgery, University of Illinois College of Medicine, Chicago; \$1,400 for visit to Germany to study the human brain

Dr. Hubert Bloch, Public Health Research Institute of the City of New York, Inc.; \$1,500 for visit to Germany to study psychosomatic aspects of tuberculosis

Miss Ruth Freeman, the Johns Hopkins University, Baltimore, Maryland; \$750 for visits to schools offering graduate programs for public health nurses, to study administrative and curricular patterns

Professor Karl Meyer, College of Physicians and Surgeons, Columbia University, New York; \$2,150 for trip to Europe to study physiology and biochemistry of connective tissue

Miss Janice E. Mickey, University of Pittsburgh, Pennsylvania; \$1,000 for visits to study graduate programs for public health nurses at various institutions in the United States

Miss Elizabeth Cogswell Phillips, executive director, Visiting Nurse Association, Rochester, New York; \$900 for visit to Scandinavian countries and Finland to observe public health nursing service and education programs

Dr. Leonard S. Rosenfeld, United States Public Health Service; \$1,000 for honorarium while advising the Venezuelan Ministry of Health

Dr. Nevitt Sanford, Berkeley, California; \$5,000 for expenses of visiting lectureship at Tavistock Institute, London, England, and for visits to the Continent to study clinical psychology

Dr. Lyman B. Smith, associate curator, Department of Botany, Smithsonian Institution, Washington, D. C.; \$850 for travel expenses to and from Brazil to study bromeliads important in malaria control

Dr. Harry Benjamin Van Dyke, College of Physicians and Surgeons, Columbia University, New York; \$1,400 for visit to selected centers of pharmacological research in Europe

Harvard University, Cambridge, Massachusetts; \$5,000 for expenses of expedition to Mendoza, Argentina, of team attached to Massachusetts General Hospital, Boston, for study of endemic goiter

**DIVISION OF
NATURAL SCIENCES AND AGRICULTURE**

DIVISION OF
NATURAL SCIENCES AND AGRICULTURE

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Associate Director

HARRY M. MILLER, JR.

Assistant Directors

WILLIAM F. LOOMIS¹

GERARD R. POMERAT

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FOR AGRICULTURAL ACTIVITIES

E. C. STAKMAN, *Chairman*

RICHARD BRADFIELD

P. C. MANGELSDORF

¹ Resigned December 31, 1951. Appointed Consultant as of January 1, 1952.

² Appointed Deputy Director for Agriculture December 5, 1951.

³ Appointment effective December 5, 1951.

⁴ Appointment effective November 1, 1951.

⁵ Appointment effective August 1, 1951.

⁶ Appointment effective October 1, 1951.

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DIVISION OF NATURAL SCIENCES AND AGRICULTURE

A statement describing the programs, plans and aims of the recently reorganized Division of Natural Sciences and Agriculture will be found in the President's Review section of this report, pages 35 to 54. The 72 appropriations made by the Foundation in these fields in 1951 totaled \$3,680,208.

Of these grants, 48, totaling \$1,701,960, were in the field of experimental biology. The grants ranged in size from \$2,500 for chemical equipment at the University of Edinburgh to \$200,000 to assist cytogenetic studies at Indiana University.

In 1951, a total of \$867,248 was appropriated for activities in the field of agriculture. Of this sum, \$757,748 represents 12 appropriations for use directly or indirectly for the operating programs in agriculture which are being carried out collaboratively with the governments of Mexico and of Colombia. In these operating programs, the Foundation furnishes scientific staff, and the funds are expended under its own administrative control. The remaining \$109,500 represents five other appropriations made to

institutions or governments for projects in agriculture carried out under their administration.

Four of the 1951 grants, totaling \$211,000, were in fields other than experimental biology and agriculture. One was to the National Research Council in support of its Office of Scientific Personnel; another grant, made jointly with the Division of Social Sciences, was for a program of advanced training in statistics at the University of Chicago; the other two were to the Conservation Foundation for its work on the utilization of natural resources.

In addition to the grants just summarized, \$900,000 was appropriated for fellowships and grants in aid. This sum includes a grant of \$150,000 which was made to the National Research Council for fellowships in the natural sciences during a three-year period, the sum of \$300,000 for fellowships to be administered directly by the division during 1952 and \$450,000 appropriated for support to the natural sciences through grants in aid in 1952.

EXPERIMENTAL BIOLOGY

GENETICS

COLUMBIA UNIVERSITY

Human Genetics

Many of the mechanisms which determine human heredity and evolution are of a universal character shared with and arising from the same mechanisms in animals and plants. Researches in basic genetics have moved forward rapidly in recent years, and

improved statistical techniques have been devised for the study of genetic problems. It seems likely that the resulting advances in our knowledge of the biology of man will yield conclusions and develop methods of value to the other sciences dealing with man.

Excellent training in biology, as in anthropology or in medicine — each considered individually — is available for advanced students in many institutions, but it has nevertheless been difficult to obtain a broad and fundamental picture of the biological character of man. The result is that cooperative research has not yet taken place, at least to a satisfactory degree, on such problems as the nature, causes and effects of the variability which is so marked a characteristic of all human beings and cultures.

To meet such needs, Columbia University is now setting up an Institute for the Study of the Biological Basis of Human Evolution. The two men who will direct the institute are Professors Leslie C. Dunn and Theodosius Dobzhansky of the Department of Zoology; they have been working for many years on projects of subhuman genetics with mice and fruit flies, respectively. Their experience in dealing with animal population problems and their understanding of the heredity make-up of these populations in relation to environment are sure to be profitable when applied to human populations.

The university proposes to house the new institute in the Nevis Mansion at Irvington-on-Hudson. A three-year grant of \$90,000 from The Rockefeller

Foundation will provide equipment and help to meet general expenses.

INDIANA UNIVERSITY

Cytogenetics

Genetic studies at Indiana University, aided by The Rockefeller Foundation since 1940, this year received a five-year grant of \$200,000. The university has assembled a group of geneticists with diversified backgrounds and a notable record of productive research. While each of the men is working independently in his own field, the over-all result is a broad attack on the problems related to the mechanisms of inheritance.

One of these men is Professor H. J. Muller of the Department of Zoology, a classical geneticist specializing in mutation as manifested in animals. Dr. Muller received the Nobel Prize in 1946 for his demonstrations with drosophila flies that X-rays can permanently alter the heredity of the cell. Artificial mutations so induced occur at as much as 150 times the natural rate, and entirely new forms can be created. X-rays have since become an important tool of the geneticist, paving the way for studies of similar mutations originating from other sources.

Another of the Indiana University geneticists is Professor Ralph E. Cleland of the Department of Botany. Dr. Cleland is interested in the cytology and the genetics of plants, particularly the genus *Oenothera*, the evening primrose. The chromosomes of this genus are arranged in a distinctive ring-like structure, and the consequently modified behavior

of the chromosomes has been a challenge to research workers since early in the century. Dr. Cleland's studies have traced the outlines of a unique story of evolutionary development. Further details are being filled in by research on hybridization between the variously occurring *Oenothera* in both North and South America. The work will be facilitated by the eight acres of land, with a field laboratory and greenhouse, which the university has recently placed at Dr. Cleland's disposal.

The third member of this group is Professor Tracy M. Sonneborn of the Department of Zoology, who is studying the complex relationships between genetic particles in the cell fluid and in the nucleus. Until recently it has been generally accepted that genes are found only in chromosomes, and that these chains of genes alone control heredity. The chromosomes are contained within the inner core or nucleus of the cell, which is surrounded by a thinner fluid known as cytoplasm. In the course of his 20 years at Indiana, Dr. Sonneborn has demonstrated that in the single-celled animal called paramecium the cytoplasm, as well as the chromosomal genes, can transmit hereditary traits. This fact appears to be true of a number of other organisms as well, so that the study of cytoplasmic inheritance is now a very active subdivision of genetics.

UNIVERSITY OF TEXAS

Genetics of Mutation

After Professor H. J. Muller made his Nobel Prize discovery that genetic mutations in fruit flies can

be artificially induced by X-rays, it was found that mutations can also be caused by heat and by chemical agents. A group under Professor Wilson S. Stone of the Department of Zoology at the University of Texas has now shown that mutations can similarly be produced in bacteria by irradiating not the organisms themselves, but the food which is fed to them.

Dr. Stone believes that when the medium in which the bacteria are grown is irradiated by ultraviolet light, hydrogen peroxide is released, and this in turn results in the formation of organic peroxides that affect the nucleic acid chain of the gene. Experiments of the same type using the neurospora mold, rather than bacteria, have given similar results. Mutations have also been induced by the introduction into the environment of a living cell of hydrogen peroxide alone, or of certain organic peroxides other than those formed by irradiation.

The Texas genetics group has also studied the cytology of over 200 of the 600 known species of the fruit fly. Whereas in 1936 only two cases of hybridization between species were known, over 91 species hybrids are now recognized, of which 65 were discovered at the University of Texas. Dr. Stone has collaborated with Dr. John T. Patterson, the recipient of Rockefeller Foundation aid for his own research, in summarizing these observations in a book entitled *Evolution in the Genus Drosophila*.

Support from the Foundation to Professor Stone continues with a three-year grant of \$50,000. This sum will help to staff and equip his expanding group

as it moves into the four-million-dollar Experimental Science Building completed this year by the University of Texas.

UNIVERSITY OF WISCONSIN

Bacterial Genetics

Professor Joshua Lederberg of the Department of Genetics at the University of Wisconsin has specialized in heredity studies of bacteria. During his work as a graduate student, Dr. Lederberg became convinced that these organisms at times demonstrate the phenomenon of sex. More specifically, he believed that if cells of different genetic constitution were allowed to grow for a time in close proximity to one another, genetic recombination would take place.

Professor Lederberg's work at Wisconsin, supported since 1948 by Rockefeller Foundation grant-in-aid funds, has shown that several types of bacteria can react with one another by a process of conjugation that results in the interchange of genes and inheritance according to Mendelian law. Thus far there is no evidence of sexual differentiation — that is, of stocks which can be labeled male or female — so that conjugation apparently occurs at random between cells of pure or mixed cultures, and can be detected only in terms of reassortment between genetically differing cells.

The Rockefeller Foundation in 1951 made a grant of \$8,000 to the University of Wisconsin in support of Dr. Lederberg's research during the period ending August 31, 1953.

PRINCETON UNIVERSITY

Meiosis Studies

Sexual reproduction involves a cell process called meiosis whereby the number of chromosomes in the germ cells is reduced to half the number regularly found in the body cells. The normal number is subsequently restored by the fusion of two germ cells — that is, the egg cell and the sperm cell — in fertilization. It is the complicated mechanism underlying the chromosome segregations in meiosis that Professor Kenneth W. Cooper of the Department of Biology at Princeton University intends to study during the next three years.

Aid from The Rockefeller Foundation in the amount of \$15,000 has been given Professor Cooper for this period. The funds will be used largely for the services of Dr. Jakov Krivshenko of the Department of Zoology at the University of Missouri, who will serve in the capacity of research associate to Professor Cooper. Their aim is to arrive at a new and more generalized theory of meiosis, with specific details on laws of chromosome segregation for the *drosophila* fruit fly.

UNIVERSITY OF LUND

Institute of Genetics

A one-year grant of \$15,000 has been made by The Rockefeller Foundation to the University of Lund in Sweden toward research in genetics under the direction of Professor Arne Müntzing. Before his appointment as professor of genetics at Lund, Dr.

Müntzing was head of the cytogenetics department at the Plant Breeding Institute in nearby Svalöf. His experience at this national agricultural station augmented his interest in the mechanism of inheritance in plants and in methods of controlling and adapting this process for the improvement of many essential food crops.

At the university's Institute of Genetics, research activities under Professor Müntzing have similarly stressed the cytological and genetical behavior of crop plants, with published studies including such topics as the mechanism of segregation in various grains, the cytology of mutation and chromosome aberration, and different factors in plant sterility. In recent years increasing emphasis has also been given to a study of chromosomal patterns in animals and humans.

In 1950 the institute laboratories were housed in new quarters and the staff was expanded. Approximately two-thirds of the Foundation grant is for the purchase of new equipment now required, with the remainder for general expenses of the research.

SMITH COLLEGE

Plant Genetics

Smith College has received a one-year appropriation of \$9,000 in continuing support of research carried out under the direction of Professor Albert F. Blakeslee. The Rockefeller Foundation has aided this work in genetics since 1942.

Professor Blakeslee specializes in plant genetics, and after retiring from the Carnegie Institution of

Washington he established a Genetics Experiment Station at Smith. The factors favoring and hindering hybridization between species have constituted a major field of investigation, together with the action of ovular tumors in inhibiting the development of hybrid embryos. Close contacts have been maintained with the neighboring colleges of Amherst and Mount Holyoke and with the University of Massachusetts, and biannual meetings are held at each of these four schools.

CORNELL UNIVERSITY

Maize Genetics Cooperation

A two-year grant of \$3,800 has been made by The Rockefeller Foundation to Cornell University toward expenses of the Maize Genetics Cooperation under the leadership of Professor H. H. Smith of the Department of Plant Breeding. This organization has collected and preserved the stock of corn seed representing the more than 300 genes that have to date been correlated with specific characteristics and has distributed these seeds, when needed by responsible investigators. In addition, it has issued a yearly news letter containing an inventory of available seed, a bibliography of recent literature and reports on various phases of corn genetics.

CHEMISTRY OF THE NUCLEIC ACIDS

One of the key problems of cellular biochemistry is the study of those unique compounds, the nucleic acids, which are main constituents of genes and

chromosomes and which play so basic a role in the hereditary mechanisms. Somewhere in the detailed configurations of these nucleic acids are presumably laid down the blueprints according to which the egg is gradually transformed into a living adult organism. Despite recent advances, further knowledge of the biochemistry of the nucleic acids remains one of the chief and one of the most promising fields in the chemistry of life processes.

COLUMBIA UNIVERSITY

Nucleic Acid Structure and Functions

One of the important laboratories in this country concentrating on the chemistry of nucleic acids is that of Professor Erwin Chargaff of the Department of Biochemistry at Columbia University. Professor Chargaff has developed a technique making possible the analysis of nucleic acid samples as small as 0.005 milligram. His present investigations concern the chemical structure of nucleic acids and their specific biological functions in cell division and growth and in the transmission of hereditary properties. These studies will undoubtedly find wide application in work on normal and malignant growth, tissue culture, virus propagation, bacterial transformation and the genetic problems of inheritance.

In 1950 Professor Chargaff's group moved into enlarged laboratory quarters on the twelfth floor of a recent addition to the Columbia University College of Physicians and Surgeons. Up to \$12,000 of The Rockefeller Foundation grant of \$50,000 may be used to purchase equipment for the new laboratory.

The remainder of The Rockefeller Foundation grant, extending as it does over a period of three years, will help to put the laboratory on a more stable footing than is currently possible. The professional personnel consists of both graduate students and postdoctorate research fellows — important in that young scientists are being trained for future chemical investigations of the basic units of heredity.

Professor Chargaff's work also receives financial assistance, on an annual basis, from the United States Public Health Service, the American Cancer Society, the Life Insurance Medical Research Fund and the Nutrition Foundation.

STANFORD UNIVERSITY

Analysis of the Nucleic Acids

In his 12 years at Stanford University, Professor Hubert S. Loring of the Department of Chemistry has been developing chemical methods for the separation of the various nucleotides which make up nucleic acids. The task has proved exceptionally difficult, as there are apparently several isomers of each of the nucleotides — a fact that has only recently become evident. With the discovery of methods for the separation of these isomers, progress can now be expected in measuring these substances and in defining the basic building stones from which the genes are assembled.

Professor Loring's work follows three main directions: 1) the analysis of nucleic acids with the objective of showing differences in chemical composition and establishing that nucleic acids differ

depending on their source; 2) the isolation and chemical study of the structure and interrelationships of the isomeric nucleotides; and 3) the mode of action of the nucleases (those enzymes which split nucleic acid into its component nucleotides) and the nature of the components liberated. These studies are closely interrelated and will also be significant in research on the chemistry of other large molecules.

Since 1945 The Rockefeller Foundation has provided continuous aid to Professor Loring's program. In addition, he was awarded a special fellowship in 1948 enabling him to visit various biochemical laboratories in Europe. This year he receives three-year support in the amount of \$36,000.

TUFTS COLLEGE

Biochemistry of the Nucleic Acids

Among the talented German chemists who emigrated to the United States with the rise of Nazi oppression was Professor Gerhard Schmidt. After working at several institutions, including the laboratories of The Rockefeller Institute for Medical Research, Professor Schmidt accepted a position at Tufts College. For the past ten years he has been associated there with Professor S. J. Thannhauser, himself a German refugee.

The work of Professors Schmidt and Thannhauser was originally concerned exclusively with brain metabolism. A review of the program at the time of Dr. Thannhauser's retirement in 1950 disclosed that its focus has gradually shifted to the chemistry of the nucleic acids, regardless of tissue source.

At present, Professor Schmidt — like Professors Chargaff at Columbia and Loring at Stanford — is interested in getting at the basic chemical nature of the genes and chromosomes which determine man's hereditary make-up. Supported by a three-year Foundation grant of \$30,000, the research at Tufts centers on the chemistry and metabolism of the higher nucleic acids and certain phospholipids. Professor Schmidt is developing enzymatic methods to split the nucleic acids step by step into their constituent parts, thereby obtaining information as to the various ways in which these pieces are joined together to form the functional gene.

THE INDIVIDUAL CELL

Only in fairly recent years have scientists come to the realization that samples of protoplasm, whether found in the cells of men, mice or microbes, present essentially common problems. Studies of cellular functions in any organism are, therefore, of great significance in furthering basic knowledge of the production and growth of all living matter.

STANFORD UNIVERSITY

Metabolism Studies

Dr. C. B. van Niel of the Hopkins Marine Station at Stanford University has chosen to devote his energies to the examination of the fundamental life processes in nonpathogenic bacteria. For the past 23 years he has been investigating these microorganisms with their easily reproducible systems in which metabolism may be readily followed.

Dr. van Niel's most remarkable contributions have been in explaining the mechanism of photosynthesis. Until recently, this was considered a unique reaction of the plant world whereby carbon dioxide is absorbed and fixed into leaf substance and oxygen is liberated to the atmosphere. Dr. van Niel showed that this reaction of plants is only one of a far broader group of photosynthetic reactions. He demonstrated that certain bacteria are able to utilize light and carbon dioxide to produce their own food and cell materials by means of a form of photosynthesis simpler than that of green plants equipped with chlorophyll. Instead of reacting with carbon dioxide to release oxygen, the light reacts with a water molecule, splitting it into two pieces. The resulting hydrogen atoms react further in reducing and binding carbon dioxide into organic molecules. Dr. van Niel's demonstration of the four successive steps of this photosynthetic transfer is widely recognized as an important advance in our knowledge.

In addition, Dr. van Niel has isolated the light-absorbing pigments in photosynthetic bacteria, finding them to be very different from those in the higher plants which carry on photosynthesis.

Foundation aid to Dr. van Niel's research began in 1948 with a three-year grant of \$20,000. This year the Foundation has appropriated \$30,000 to continue support for another four years.

UNIVERSITY OF WISCONSIN

Nitrogen Fixation

Just as all animal life on the face of the earth would cease without green plants, so these green plants

would eventually wither away without certain nitrogen-fixing bacteria. These organisms are able to take nitrogen gas from the air and combine it with other elements to form the soluble ammonias and nitrates used as fertilizer by growing plants. Some species work alone, processing nitrogen independently for their own nutritional requirements; others operate in partnership with leguminous plants, which grow nodules at their roots as little "rooms" to house the bacterial partners.

Studies of these mechanisms at the University of Wisconsin have been under the direction of Professors Perry W. Wilson of the Department of Bacteriology and Robert H. Burris of the Department of Biochemistry. New biochemical techniques such as isotopic tracers and chromatography have been used successfully, and the research is currently being broadened to include not only biological nitrogen fixation but other phases of nitrogen metabolism of plants and bacteria, specifically the assimilation of inorganic nitrogen by such agents.

With the recent discovery that certain photosynthetic bacteria also fix nitrogen, and with the availability of tracers for both carbon and nitrogen, comparative studies of nitrogen metabolism and photosynthesis become feasible. Compounds are labeled chemically or biosynthetically with isotopes and supplied to plants or microorganisms. After a time, various compounds, including organic acids and amino acids, are isolated and analyzed by standard chemical procedures.

The current Rockefeller Foundation grant of \$28,750 continues support begun in 1940 for this

program of biochemical research under Professors Wilson and Burris.

UNIVERSITY OF SHEFFIELD

Biochemistry of Cell Metabolism

One of the distinguished biochemists of this generation is Professor Hans Adolf Krebs. Two of nature's main metabolic pathways are named for him, the Krebs oxidative cycle and the Krebs urea cycle. Born and educated in Germany, Dr. Krebs went to England to study in 1933 and remained there when Hitler seized power in Germany. Two years later he was appointed to the staff of the Department of Biochemistry at the University of Sheffield, where he is at present both professor and chairman of the department.

The studies in cell metabolism under Dr. Krebs's leadership are centered on the chemical mechanisms by which living cells utilize foodstuff energy. Different aspects of general enzyme biochemistry included in the scope of the research are the intermediary stages of the oxidative breakdown of nutrients in those organisms where the tricarboxylic acid cycle is not the major pathway of oxidation; the measurement of the free energy changes associated with oxidative processes; and the transformation of the free energy into other kinds of work. It is planned to increase the use of radioactive tracers in exploring these problems, and a portion of the current Foundation grant will be used to procure labeled organic compounds.

Dr. Krebs is director of a British Medical Research Council unit for research in cell metabolism and

receives support from the council as well as from the university. The Rockefeller Foundation this year continues its aid with a three-year grant of \$35,000, largely for the purchase of scientific equipment and chemical supplies.

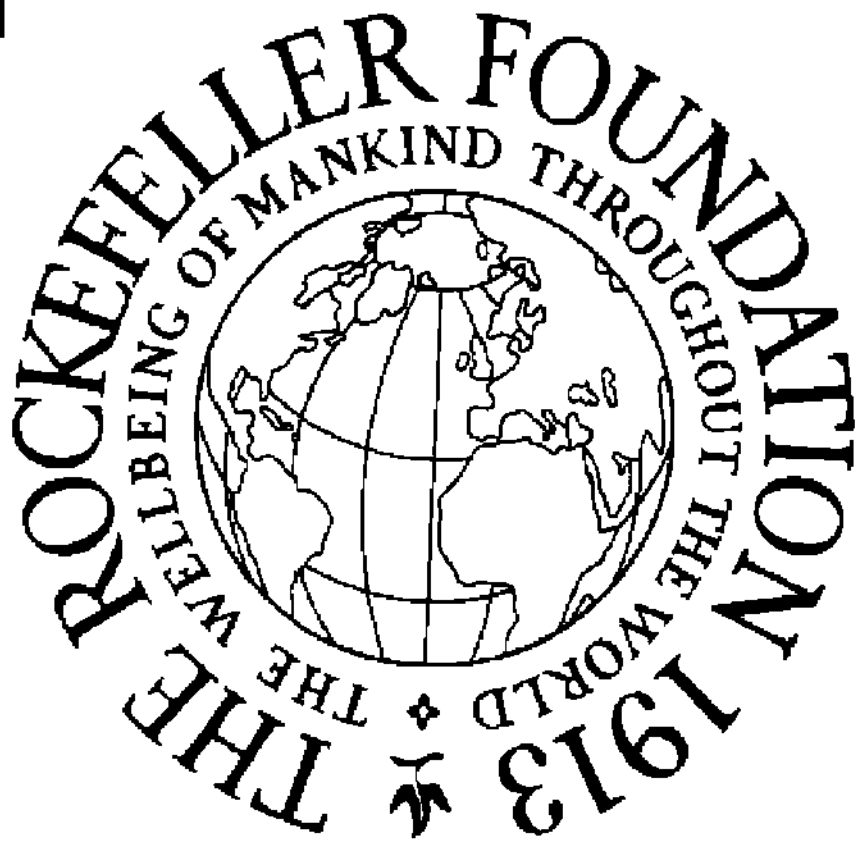
UNIVERSITY COLLEGE, DUBLIN

Ion Exchange

Under Professor E. J. Conway of the Department of Biochemistry and Pharmacology at University College, Dublin, a group of young scientists is studying certain aspects of the fundamental chemistry of the cell. Between the individual cell and the tissues which surround it, an exchange of inorganic ions is continually taking place. It is this process, and the resulting ion accumulation, which Professor Conway's laboratory is investigating. Particular attention is given to potassium and chloride ions in the cells of higher organisms.

Also being studied are exchanges in the yeast cell during fermentation and at rest; the relation between membrane potentials and ion exchange rates; the theory of hydrochloric acid secretion by cells of the gastric mucosa; and the effect of cortisone and insulin on the change of levels of phosphate esters and inorganic ions in mammalian muscle. Further methods of microanalysis and microdiffusion are being developed in relation to carbon monoxide in blood, acetic acid and other volatile fatty acids, and chloroform in blood.

The Rockefeller Foundation has made a three-year grant of \$12,000 to University College, Dublin, in



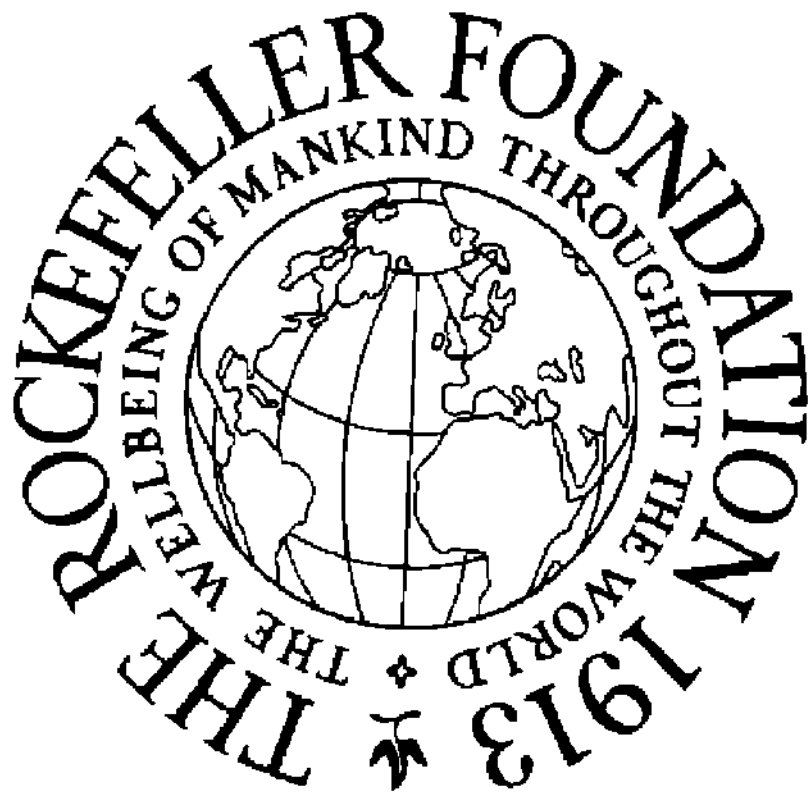
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Photographing the reciprocal lattice of a crystal at the Massachusetts Institute of Technology

Research in fruit-fly genetics at Indiana University



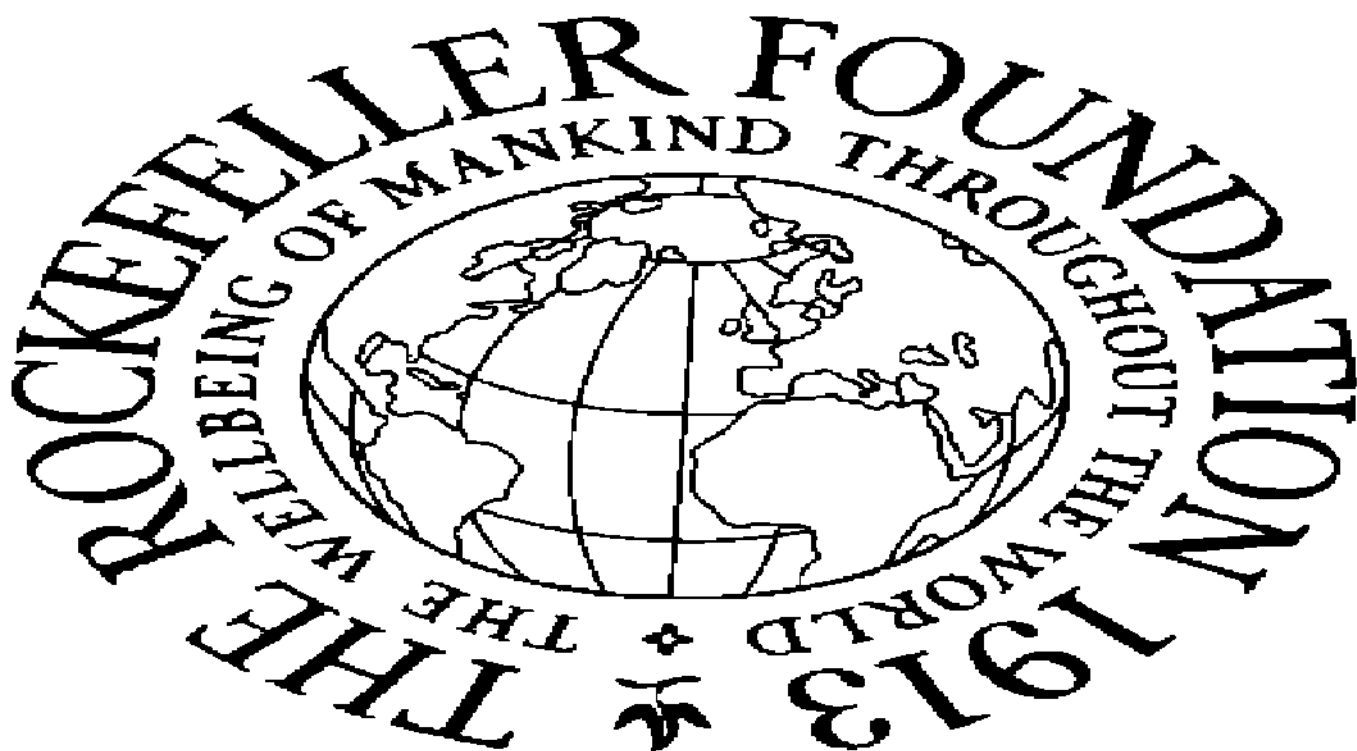
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Investigations into the fundamental chemistry of the cell at University College, Dublin

The Laboratory for Cell Physiology at the University of São Paulo, Brazil



Photograph Excised Here

support of Professor Conway's research. This sum is to be used to purchase equipment, including a high-speed centrifuge, and to supplement the salaries of technical assistants in the laboratory.

UNIVERSITY OF COPENHAGEN

Ion Transport

For almost 20 years The Rockefeller Foundation has supported research on the application of physical, chemical and mathematical techniques to biological problems at the University of Copenhagen, Denmark. The work, concerned primarily with the use of isotopes or tagged atoms, represents the successful cooperation of personnel from several institutes of the university.

Present activities are under the general direction of Professor Niels Bohr of the Institute of Theoretical Physics and Professor P. Brandt Rehberg of the Laboratory of Zoophysiology, with the collaboration of two former Rockefeller Foundation fellows, Professors George Hevesy and Hans Ussing. Recent investigations have centered on the active transport of inorganic ions across isolated surviving animal membranes. The identity of electric current and active sodium ion transport has been demonstrated under various conditions. It is planned to continue this work on clarifying the origin of bioelectric potentials and currents by means of the isotope technique developed in the laboratory.

Since the group's early efforts, its program has matured sufficiently to win it a permanent place at the university. Personnel appointments have been

stabilized, and a new wing has been provided to house all the biophysics work in a single laboratory. This year's grant of \$32,000 from the Foundation is a tapering one for a period of five years and is intended as terminal support for a project which has shown its ability to function independently.

COLUMBIA UNIVERSITY

Cellular Conversion of Sugar

One of the basic facts about the chemistry of the cell is that it uses two kinds of sugars for quite different purposes. One sugar is used primarily as fuel, while the other is used solely as building material for the construction of the nucleic acids that make up the genes and chromosomes. The first, or fuel, type of sugar comprises the hexoses that have six carbon atoms hooked together in a chain; in contrast to this, the nucleic acids utilize only pentoses, five carbon atoms long, in their construction. One of the important problems in biochemistry is how the cell changes the six-carbon sugars into the five and vice versa.

Professor Zacharias Dische of the Department of Biochemistry at the College of Physicians and Surgeons at Columbia University, having worked on this question for a number of years, has recently found an enzyme system that converts five-carbon sugars into six-carbon sugars. His present need is for the services of a synthetic organic chemist to help him work out the intricacies of this conversion and of corresponding reactions in the opposite direction. For the salary of such a collaborator, as well

as for certain necessary chemicals and equipment, The Rockefeller Foundation has provided \$20,000 over a three-year period for Dr. Dische's use.

UNIVERSITY OF SÃO PAULO

Cytochemistry

Professor Luiz Carlos Junqueira, a former fellow of both the Rockefeller and Guggenheim Foundations, was recently made head of the Department of Histology and Embryology of the Faculty of Medicine at the University of São Paulo, Brazil. Dr. Junqueira is in charge of a group there doing research in the field of cytochemistry; his program on the normal and pathological functioning of the individual cell includes studies of protein synthesis and cell secretion, particularly the mechanism of hormone production and action. A Rockefeller Foundation grant of \$14,000, available during the period ending May 31, 1953, is to be used toward equipment and supplies for the project under Dr. Junqueira's direction.

HARVARD UNIVERSITY

Cellular Anatomy

A grant of \$64,000 has been made by The Rockefeller Foundation to Harvard University to continue support of research in cellular anatomy under the direction of Professor George B. Wislocki of the Medical School.

Widely known for his earlier work on the comparative endocrinology of mammals, Professor Wislocki has developed in his department at Harvard a rather

broad program in histochemistry. This represents an extension of the older field of morphological histology along lines of modern biochemistry. Whereas the chief emphasis of classical histology was the development of staining techniques to render visible the detailed anatomy of the cell, the modern histological approach is to treat frozen sections (that have not been fixed with formalin) with various enzymes and enzyme stains in order to locate in the cell the relative positions of such substances as the nucleic acids and such enzymes as the phosphatases and lipases.

Under Dr. Wislocki, the field of histological anatomy already has been significantly extended. He now proposes to study the distribution and regulation of enzymes and cells and tissues, as controlled by endocrine factors and vitamins, in relation to growth and aging.

DEVELOPMENT AND GROWTH

Current biological research is heavily concerned with genetics on the one hand and with physiology on the other, but between the inception of an organism and its functioning in the adult state there lies a process of development in which the inherited potentialities are realized. This middle zone between genetics and physiology is still only very partially understood. The gaps in our knowledge become increasingly evident with the emphasis of today's organized research on cancer, arthritis and heart disease; for any knowledge of abnormal development

must logically proceed from a thorough familiarity with normal growth mechanisms.

NATIONAL RESEARCH COUNCIL

Committee on Developmental Biology

The National Research Council, recognizing the inadequacy of our knowledge of development and growth, has taken steps to improve this situation by the creation of a Committee on Developmental Biology toward which The Rockefeller Foundation has made a two-year grant of \$25,000. The new committee is under the chairmanship of Dr. Paul Weiss, professor of zoology at the University of Chicago.

Since a critical evaluation of the knowledge already available must necessarily be the first step in any such program, during the early years of its existence the committee proposes to stress small conferences of scientists from the several tributary fields, personnel exchanges among various laboratories, seminars for advanced students, workshops, surveys and reviews from new viewpoints, and bulletin services. Ultimately the aim is to encourage cooperative attacks by presently scattered investigators on unexplored facets of development and growth, and to promote adequate attention to these areas in the educational programs of institutions of higher learning.

UNIVERSITY OF CALIFORNIA

Hormone Functions

What are the mechanisms by which growth occurs; how is its rate determined; what causes abnormalities

and how can they be prevented or treated? These are some of the questions receiving the attention of Professor Choh Hao Li and his staff of 27 in the Department of Biochemistry at the University of California.

With these problems in mind, Dr. Li is investigating the growth regulating aspects of those proteins in the human body which are active as hormones, rather than as enzymes. Since 1938 he has specialized in the purification of pituitary hormones; five of the six known hormones of the anterior pituitary gland have been isolated by successfully adapting techniques used in enzyme chemistry. The molecules of pure hormone are now being cut down into smaller units and determinations made as to the smallest fraction which still retains the activity of the entire molecule. In this way a structural analysis can be made of the vital center which regulates hormone function, and attempts at synthesis — at present impossible with the vastly larger hormone molecule — become feasible.

One of the five pituitary hormones is the anabolic "growth hormone," another is the catabolic ACTH. Together they control the over-all rate of growth, in a proportion which is being assessed by separate injections of the two hormones into laboratory animals. Since the potentialities of ACTH in the treatment of arthritis and other diseases have been realized, the tendency has been to think of Dr. Li entirely in terms of his work on this one hormone. To provide support for the more general aspects of his research, The Rockefeller Foundation has made

a grant of \$25,200 which will cover a period of three years.

UNIVERSITY OF WISCONSIN

Pathological Growth

For the past 20 years, Professor A. J. Riker of the University of Wisconsin has been studying the fundamentals of pathological growth — what starts it, what keeps it going and what inhibits it. To attack the problem, Professor Riker and his associates in the Department of Plant Pathology are using plant, rather than animal, tissue. Any disturbance of the delicate balance that exists in normal plant growth has a definite bearing on parallel studies of animal tissue, for many of the basic components of the two types of tissue are similar or identical.

The advantages of using plants are numerous. Plants have no complex nervous, digestive and circulatory systems to complicate metabolism; they are inexpensive and readily available; experimental manipulation is easy; vegetative propagation makes it possible to avoid genetic variations; and, above all, plant tissue can be cultured on media containing only nutrients of known chemical formula, so that growth in such cultures is due entirely to known and measured substances and can be quantitatively evaluated merely by weighing the tissues.

Professor Riker has concentrated his research on crown gall, an abnormal growth caused by certain bacteria entering wounds on rosaceous plants (raspberries, pears, apples and roses, for example). An obvious counterpart in animal tissue is cancer, and

in recognition of the importance of Professor Riker's work, the American Cancer Society, together with the Wisconsin Alumni Research Foundation, is assisting his laboratory. In 1951 The Rockefeller Foundation supplemented this aid with a five-year grant of \$45,000.

MASSACHUSETTS GENERAL HOSPITAL

Spectroscopy Techniques

During recent years the application of physical methods to problems of biology and medicine has constantly increased in scope. Among these methods spectroscopy, alone or in conjunction with microscopy, aids in the attempt to describe the structure and functioning of a single cell or a small group of cells in terms of the chemical substances involved. Almost any chemical compound — whether vitamin, hormone or coenzyme — can be identified in terms of specific absorption curves. Certain details of structure absorb light in the visible wave lengths, some absorb light in the ultraviolet and others in the infrared. A combination of the results obtained gives the research worker an analytic tool of great range and precision.

For proper use of this technique, a large catalogue of absorption spectra is essential. Thus far, the tremendous labor involved has prohibited the compiling of such information except for a few classes of compounds. The work can now be expedited by means of newly available recording spectrophotometers for the visible, ultraviolet and infrared portions of the spectrum. These instruments represent a

distinct advance in accuracy and rapidity over the previous nonrecording models.

The Spectroscopic Laboratory of the Massachusetts General Hospital, located in the recently completed Research Building, has been granted the sum of \$21,310 by The Rockefeller Foundation for the purchase of a recording visible and ultraviolet spectrophotometer and a recording infrared spectrophotometer. The laboratory is under the supervision of Dr. Jesse Scott, also associated with the important spectroscopy group at the Massachusetts Institute of Technology.

Under investigation at the hospital laboratory is the relationship of the components of nucleic acids to the problems of normal and abnormal growth, specifically cancer. This is one of a number of research projects for which the new optical equipment will prove useful.

X-RAY CRYSTALLOGRAPHY

X-ray crystal analysis is one of the most promising tools for research on the biochemical structure of crystalline substances. Briefly, it involves directing a beam of X-rays onto a crystal, photographing the complicated pattern of reflections of these rays from the various crystal planes and then trying to calculate the structure which the crystal must have had to produce the observed reflections. By means of this procedure, structural data may be obtained on molecules which have not yielded to any other physical or chemical techniques.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Structure Determinations

The Rockefeller Foundation has made a grant of \$11,000 to the Massachusetts Institute of Technology in support of research carried out by Professor Martin Buerger of the Department of Geology. Dr. Buerger has been working on a new approach to the determination of crystal structure by X-ray diffraction techniques. Up to now, crystallographers have had to go through the arduous task of imagining structures, calculating the diffraction pattern which the imagined structure would produce, comparing this with the actual pattern and then adjusting the assumed pattern until it fits the actual one. This complicated procedure, together with the extreme length of the calculations involved, has often necessitated spending as long as two or three years on a single structure determination.

Professor Buerger has attacked the problem from a somewhat different viewpoint. Instead of using the classic mathematical formulation, he has evolved a method which seeks to progress from the Patterson diagram obtained from the experimental data step by step back to the actual space array of the electrons. A few tentative structure determinations have been made using the "image-seeking" functions of Dr. Buerger's process, but further corroboration is necessary to determine whether or not this procedure is of wide and useful application.

The Foundation's support of this project complements its interest in research along other lines of

crystallographic investigation at such institutions as the Polytechnic Institute of Brooklyn and by upwards of a dozen other men or groups, and its indirect aid to the International Union of Crystallography. Dr. Buerger attended the Stockholm meeting of the latter organization in the summer of 1951, then was enabled to extend his travel and visit the principal European crystallographic laboratories. The balance of the grant is to be used for research assistance and supplies.

PENNSYLVANIA STATE COLLEGE

Crystallographic Analysis

One of the most troublesome bottlenecks in X-ray crystal analysis has been the tedious and time-consuming mathematical computation involved. A major advance was recently made by Dr. Raymond Pepinsky of Pennsylvania State College with his design of an electronic device which can handle this very specialized computing job with great speed and power. About a hundred structures have now been analyzed with the aid of these machines, and the results have been of use to scientific workers all over the world.

Research under Dr. Pepinsky has centered on problems which have presented particular difficulties to scientists approaching them from a chemical standpoint but which seem capable of solution by X-ray methods. Alkaloids, mitotic poisons, antibiotics, sugars and simpler compounds have been examined, and computational assistance has been furnished in studies of vitamin B₁₂, hemoglobin and

dried insulin. A program for the X-ray analysis of polypeptides is in its initial stages.

To provide Dr. Pepinsky with the services of at least one professional biochemist who will be available to select and prepare suitable specimens during the next three years, The Rockefeller Foundation has made a grant of \$20,000 to Pennsylvania State College.

POLYTECHNIC INSTITUTE OF BROOKLYN

Determination of Protein Structure

The structure of a protein molecule is much more complex than that of any molecule effectively analyzed so far, but theoretical, experimental and mathematical methods are now sufficiently developed to give some assurance that even an attack on the three-dimensional structure of a protein molecule can be successful. The analysis, however, involves difficult and painstaking research which will necessarily require many years for completion.

In 1950 The Rockefeller Foundation made a four-year grant of \$136,115 in support of a laboratory set up at the Polytechnic Institute of Brooklyn to study this problem. The group, directed by Dr. David Harker, has access to the computing facilities of the International Business Machines Corporation and is concentrating on methods of X-ray crystallography to determine the detailed structure of at least one protein molecule.

Dr. Harker has shown that crystals consisting of large complicated molecules need not be attacked immediately from the point of view of atomic ar-

rangement, but can be examined on a coarser scale by considering as units certain large groups of atoms in the structure. The relative positions of these units can be located from the X-ray diffraction data without a detailed knowledge of the atomic arrangement within each unit. Once this broad outline of the structure has been brought to light, it is possible to study the atomic arrangement within the units themselves as a second step in the process of complete structural determination.

Collaboration and interchange of information have been established with laboratories pursuing similar research throughout the world; all results and incidental data obtained at the institute are to be published promptly, for this is a project which may have far-reaching consequences in all branches of science. This year, in accordance with a policy of "forward financing," the Foundation continues its support with a grant of \$32,500 for the year beginning July 1, 1954.

PROTEIN RESEARCH

How does a cooked egg differ from an uncooked egg? Why does an antitoxin prevent one particular disease but not others? What is the distinction between cancerous and healthy living tissue? These are only a few of the questions which may be asked concerning protein activity. Huge and complicated molecular structures containing thousands or hundreds of thousands of atoms each, proteins are the basic units from which all living stuff is formed.

STANFORD UNIVERSITY

Chemistry of Protein Reactions

Among the techniques of physical biochemistry used to study the giant protein molecules are ultracentrifugation, electrophoresis, dialysis equilibrium, viscosity measurements and osmometry. All of these methods aim either to measure the physical characteristics of the large-size molecules or else to study their chemical interaction with other molecules such as those of the fatty acids, sugars or salts. Both the number of interacting molecules and the type of linkage are important, the smaller ions often altering the properties of the larger protein molecule.

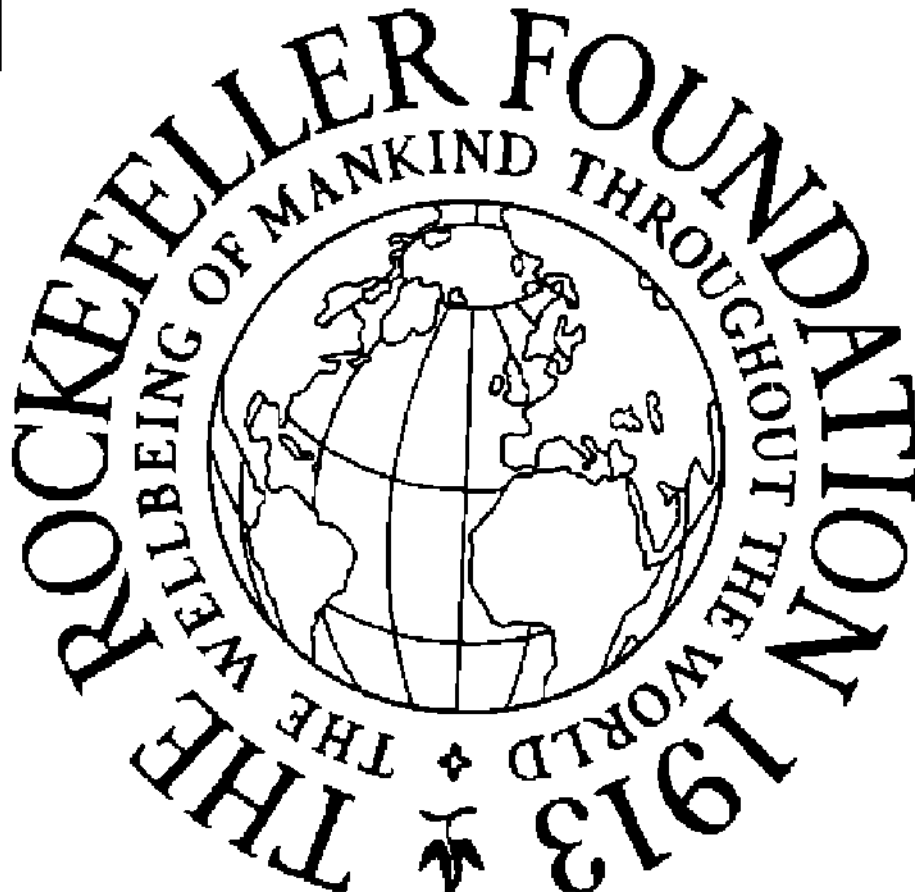
Over the past ten years, Professor J. Murray Luck of the Department of Chemistry at Stanford University has been intensively studying a number of these reactions. During the war his research was largely of a practical nature, concerned with stabilizing the serum albumin of the blood by means of fatty acid molecules; present studies pertain to anion and cation binding, topics which are of significance in any research on protein chemistry.

A two-year grant of \$13,000 in 1951 continues support given Dr. Luck by The Rockefeller Foundation since 1938.

CARLSBERG FOUNDATION

Protein Behavior

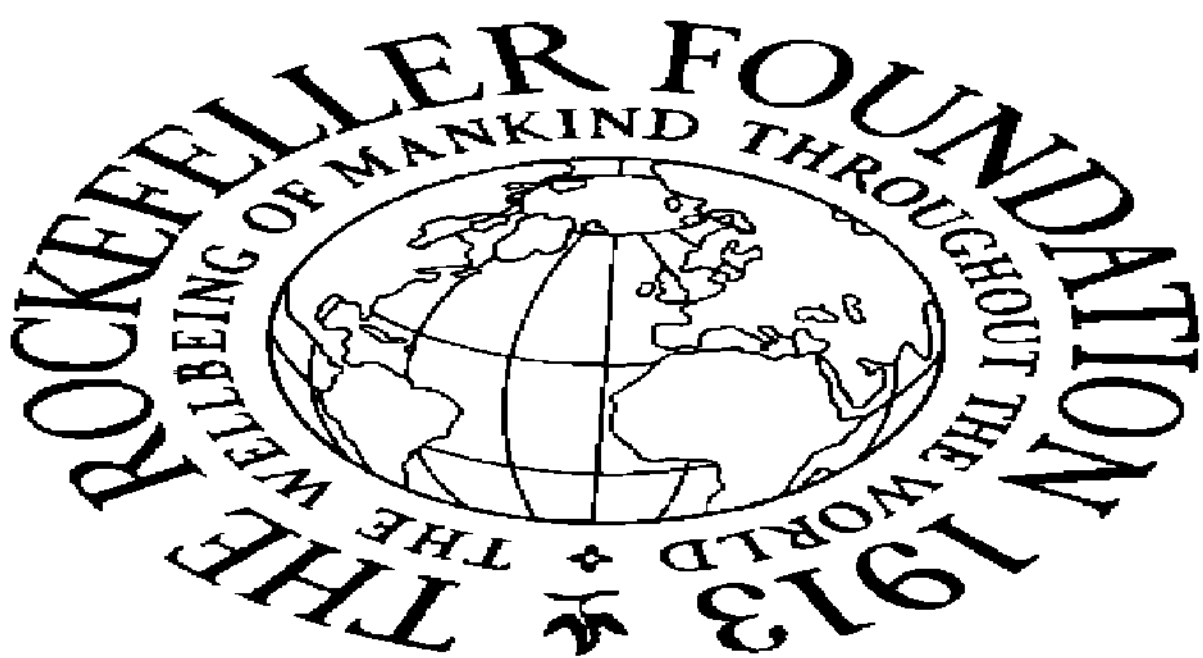
One of the laboratories in Europe which has steadily attracted research workers from all over the world is the Carlsberg Foundation in Copenhagen,



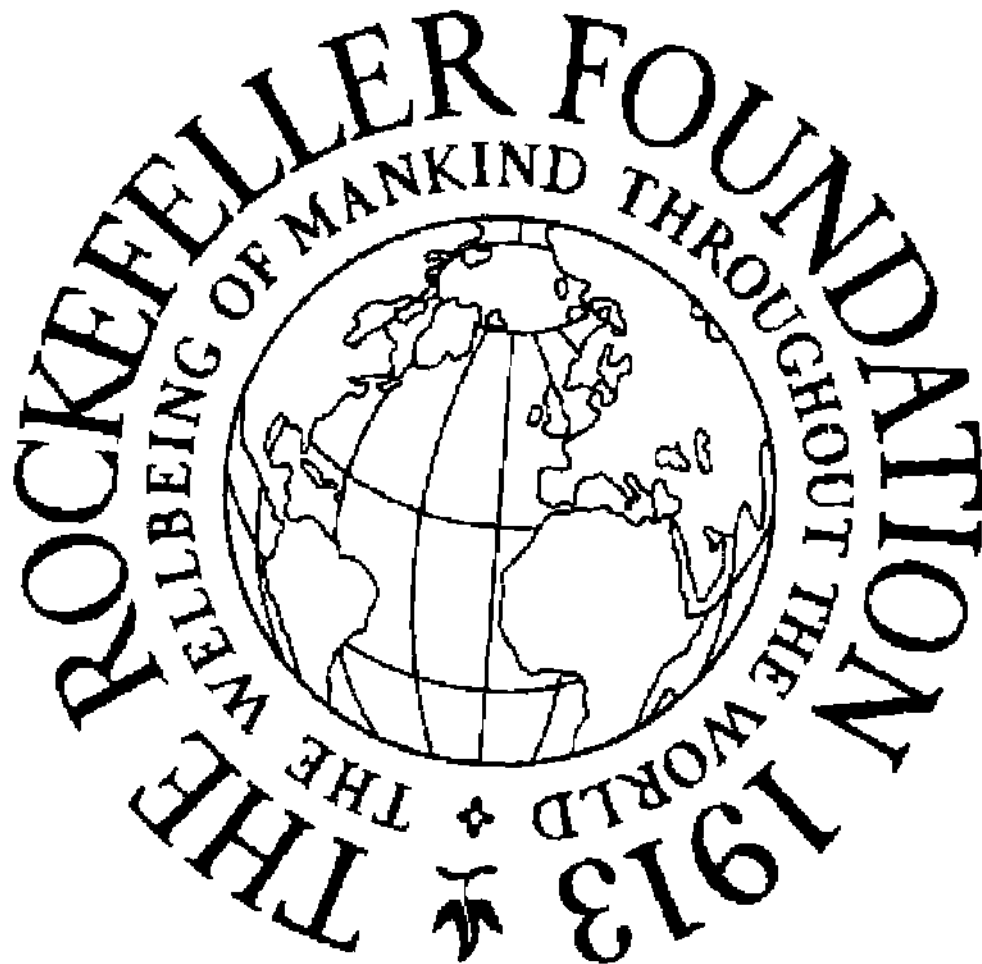
Photograph Excised Here

Density measurements in biochemical research at the Carlsberg Foundation, Copenhagen

Workers in X ray crystallography at Pennsylvania State College



Photograph Excised Here



Taking a blood sample from a tiger shark at the Marine Biological Laboratory at Woods Hole, Massachusetts

Photograph Excised Here

Denmark. During the 50 years of its existence, the Laboratory of Chemistry there has established itself as a center for the development of delicate micro-analytical techniques adapted to the study of individual cells.

Under the direction of Dr. K. U. Linderstrøm-Lang, the activities of the laboratory are presently focused on the enzymatic breakdown and synthesis of proteins *in vitro* and *in vivo*. In 1943 a subunit of cytochemistry was set up under the direction of Dr. Heinz Holter, and two years later this group was moved into its own laboratories. The collaboration between the two groups is very close, and current projects include studies on the breakdown of globular proteins, the general structure of proteins as revealed by their behavior in aqueous solution, peptide linkages and the sequence of amino acids in peptides, the purification of proteolytic enzymes, the determination of enzyme concentrations in single cells, the physiology of unicellular animals and the enzymatic changes which occur in the developing embryo.

Since 1935 the work of Drs. Linderstrøm-Lang and Holter, both former Rockefeller Foundation fellows, has been supported by the Foundation. This year a grant of \$42,500 has been made for the coming five-year period.

UNIVERSITY OF WASHINGTON

Protein Digestion

During his 12 years at Duke University, Professor Hans Neurath built up a small but good team of biophysical chemists working on the structure and

properties of various protein molecules. In 1950 Dr. Neurath resigned his position at Duke and accepted a professorship of biochemistry at the new Medical School of the University of Washington in Seattle.

Dr. Neurath has been studying certain of the digestive enzymes which assist in the breakdown of protein foods such as egg albumin and lean meat. These proteolytic, or protein-breaking, enzymes are of special interest because they frequently tackle and fragmentize molecules as large as themselves. In these cases of giant meeting giant, the enzyme itself is never broken but invariably digests the protein material on which it works.

One of the proteolytic enzymes, known as chymotrypsin, has been under intensive investigation. If the exact mechanism by which this enzyme contributes to the digestive process can be determined, then eventually, perhaps, a general pattern can be established for all enzymatic action.

The chymotrypsin is studied both as a protein and as an enzyme. As a protein, the molecule has a certain size, a certain shape and certain electrochemical properties; as an enzyme, it has a specific affinity for certain other proteins and for those structures out of which proteins are built. In studying the compound from these two points of view, a connection is being sought between the chemical characteristics and the biological activity.

These studies which Dr. Neurath pursued at Duke are being continued at the University of Washington. The new 13-million-dollar building there provides an excellent research environment, and the necessary

equipment is gradually being accumulated. Current Foundation support of \$24,000 covers two years.

HARVARD UNIVERSITY

Protein Structure

In a true solution, such as one of sugar in water, the particles of solute distributed in the solvent consist essentially of single molecules or ions. A suspension, on the other hand, contains particles that are large enough to be seen by the naked eye, or at least in the microscope. Between these two extremes are the colloidal systems, characterized by the presence of particles larger than molecules but not large enough to be seen in the microscope.

The presence of these particles can be demonstrated by optical means; when a strong beam of light is passed through a colloidal medium, the colloidal particles scatter the light. The beam is rendered visible, producing what is known as the Tyndall effect. Since the size of certain protein molecules is about the same as that of colloidal particles, solutions of such proteins tend to exhibit colloidal behavior. Thus it is possible to employ the Tyndall effect to investigate protein structure.

One of the scientists instrumental in developing a technique for quantitatively measuring this effect is Dr. Paul M. Doty, associate professor in the Department of Chemistry at Harvard University and one of the promising young biophysical chemists in the country. Dr. Doty is expert in determining the molecular weight, size and shape of large protein molecules. Specifically, he hopes to elucidate the

structure and behavior of the nucleic acids and possibly of the nucleoproteins.

In line with its policy of supporting studies of the basic life processes, The Rockefeller Foundation in 1951 made a grant of \$15,000 to further the program in the Harvard University Department of Chemistry. The funds, available for a period of three years, provide Dr. Doty with a salaried technician and allow him to purchase a Spinco preparative centrifuge.

IOWA STATE COLLEGE

Organic Chemistry of Proteins

A three-year grant of \$12,000 has been made by The Rockefeller Foundation to Iowa State College, Ames, toward a program of research in protein chemistry under the direction of Professor Sidney W. Fox. Professor Fox is studying the order of amino acids in protein chains. He and his staff have a new reagent — phenyl isocyanate — that reacts with the terminal amino acid, thus tagging it for subsequent identification. This method of analysis may aid in revealing the structure of such important peptides as ACTH.

UNIVERSITY OF ALABAMA

Properties of the Glycoproteins

A program of research on glycoproteins, the cellular compounds which are half sugars and half proteins, has been inaugurated in the Biochemistry Department of the Medical College at the University of Alabama. The director of the project is Professor Ward Pigman, who in 1947 was voted "one of the

ten ablest sugar chemists in the country" by the American Chemical Society. A specialist in applied carbohydrate chemistry with a considerable knowledge of protein chemistry as well, he is well qualified for work in the difficult hybrid field he has selected for his investigations.

A three-year Rockefeller Foundation grant of \$10,700 is to be used for the salaries of two graduate students to assist Professor Pigman in his research, and also for the purchase of apparatus for electrophoretic analysis. After studying various physical properties of the glycoproteins, the nature of the constituent groups is to be determined and particular effort made to analyze the linkage connecting the sugar with the protein material.

Professor Pigman is currently investigating the glycoproteins from saliva, from the organic material of teeth, and from bone and cartilage. The increasing number of such compounds being found in components of animal tissue and the relatively limited information available make this an extremely fertile field of interest. The glycoproteins appear to interact readily under conditions similar to those common in biological systems. In particular, the analogy to the mechanism of enzyme reactions is being explored.

GENERAL BIOLOGY AND BIOCHEMISTRY

NATIONAL RESEARCH COUNCIL

American Institute of Biological Sciences

The biological sciences today comprise so many fields of endeavor that a comprehensive organization

emphasizing the unity rather than the diversity of these activities has become a real necessity. Under the auspices of the National Research Council, the American Institute of Biological Sciences (AIBS) was established in 1948.

The institute's general aim is to promote the advancement of the biological sciences and their application to human welfare by relating them to the other sciences, to the arts and industries, and to the public good. In the three years of its existence, the group has made a considerable measure of progress toward this goal. It has organized advisory committees to government boards, collected and compiled tabular data for a biological handbook, negotiated with the Office of Naval Research for a contract with *Biological Abstracts* to put its indices on a current basis and arranged for annual meetings of constituent societies.

Projects under way include the establishment and maintenance of an up-to-date roster of biologists; implementation of the newly formed placement service; and consideration of a central publication section to handle journals for the member societies or else assist them in arranging for publication, first setting up certain standards of format and style. In addition, the *AIBS Bulletin* is to be expanded.

With 20 biological societies currently affiliated, the institute is extending its services to attract new member groups and outside financial support. The administration is confident that within four years the organization can be self-supporting. A Rockefeller Foundation grant of \$40,000 toward the

general budget has been made, to be applied in decreasing amounts over this four-year period.

UNIVERSITY OF CAMBRIDGE

Biochemistry

Two sums were appropriated by The Rockefeller Foundation in 1951 to the University of Cambridge. The first is a two-year grant of \$15,000 toward the purchase of equipment for research in the Department of Biochemistry, headed by Professor F. G. Young. This department is divided into five units dealing with enzyme chemistry, microbiological chemistry, protein chemistry, plant biochemistry and hormone chemistry, the last-named group being under Professor Young's personal supervision.

Current lines of research in the department include: a) the purification of enzymes and the elucidation of their mechanism of action; b) the investigation of the mechanism of synthesis of proteins and related substances in plants and animals; c) the purification of protein hormones and the determination of the mechanism of the biological action of hormones, particularly with respect to their influence on enzyme systems; d) the investigation of the chemical structure of biologically active proteins; e) the determination of the structure of polysaccharides and the elucidation of the mechanism of their enzymic production; f) the biochemistry of microorganisms, especially the mechanism of the synthesis of proteins and esters, and the action of chemotherapeutic agents; and g) the mechanism of oxygen production in the chloroplast of the green

leaf and the origin and metabolism of glycosides in plant tissues.

Closely affiliated with the Department of Biochemistry is the University Chemical Laboratory under the direction of Alexander R. Todd, professor of organic chemistry. Professor Todd is well aware of the importance of firm rapport between the disciplines of organic chemistry and biochemistry, and has evidenced this interest by his work on the chemistry of living stuffs.

The laboratory's research program has laid stress on the synthesis of the components of the nucleic acids, of certain vitamins such as the anti-pernicious anemia factor vitamin B₁₂ and of various coenzymes. A few years ago this work in synthetic biochemistry led to the first total synthesis of adenosine triphosphate, or ATP, the key substance which is responsible for storing within cells the energy released in the respiratory cycle.

Professor Todd's sizable group is also studying chemical factors associated with parasitism, especially the nature of specific stimulants produced by host plants which bring about seed germination in certain plant parasites. Under investigation too is the chemistry of aphid coloring matters. These are a novel type of natural pigment, and it is hoped to learn more of their structure and their function in the insects.

Previous Rockefeller Foundation support to Professor Todd has been toward the purchase of equipment needed for his work. This year a five-year grant of \$82,500 was made, not only for this purpose

but also to subsidize postgraduate research workers and thereby stabilize the program of this distinguished laboratory.

YALE UNIVERSITY

Synthesis of Amino Acids

Doubtless stimulated to some extent by the outstanding example of the Department of Biochemistry at the University of Cambridge, many universities today are attempting to create biochemistry departments that can present the subject as a unit, undisturbed by artificial dividing lines. Until lately, American universities have provided training in biochemistry chiefly within the framework of a medical school program. There have, of course, been notable exceptions where biochemistry, as at the University of Wisconsin, is particularly emphasized in the College of Agriculture. In 1950 Yale University took a major step in this respect by appointing Dr. Joseph S. Fruton as professor of biochemistry with responsibilities to both the Medical School and the university proper.

Dr. Fruton, who held a special Rockefeller Foundation fellowship in 1948, is studying the mechanism by which the cell synthesizes amino acids into peptides. This work is a direct outgrowth of his earlier research with Dr. Max Bergmann at The Rockefeller Institute for Medical Research on the enzymes that break down proteins into their constituent amino acids. Dr. Fruton has found that the same enzymes are active in the construction as well as in the breakdown of body proteins. With the aid of several

graduate and postdoctoral workers he is investigating these reactions.

Toward the salaries of his assistants and the costs of equipment and supplies, The Rockefeller Foundation continues for another five years the aid it has given Dr. Fruton since 1945, this year with a grant of \$80,000.

UNIVERSITY OF PARIS

Biological Chemistry

The Laboratory of Biological Chemistry at the University of Paris, under the direction of Professor Claude Fromageot, a former Rockefeller Foundation fellow, is one of the foremost of its kind in Continental Europe. Twice in the past decade — once at the University of Lyon, where a wartime bomb destroyed his entire laboratory, and again in 1947 at the University of Paris — Professor Fromageot has started from minimal facilities to build up an important and active laboratory.

Present work under Professor Fromageot falls into four main categories: 1) the structure of proteins, and more particularly the distribution and sequence of amino acids in the peptide chain; 2) the nature and structure of hormones of peptide nature; 3) the role played by certain component metals in the structure and activity of enzymes and other non-enzymatic proteins; and 4) the metabolism of sulfur in biological systems.

A five-year grant by The Rockefeller Foundation in the amount of \$25,000 is intended to help stabilize the research program of Professor Fromageot and to

provide him with badly needed equipment for his laboratory.

UNIVERSITY OF OXFORD

Organic Chemistry

Sir Robert Robinson, director of the Dyson Perrins Laboratory at the University of Oxford, has been occupied for many years with the synthesis of steroids. The recipient of the Nobel Prize for Chemistry in 1947, Sir Robert recently announced the total synthesis of the male sex hormones. With this success it is anticipated that other valuable hormones of the steroid group, such as cortisone, may soon be synthesized also.

Another field of investigation at the laboratory relates to alkaloids of the indole group, particularly strychnine, brucine and vomicine. The work on strychnine has resulted in the first detailed explanation of this alkaloid and its derivatives. Other projects concern the branch-chain acids which are present in the fatty substance of the tubercle bacillus, and the isolation and structure determination of an anticancer factor found in wheat middlings.

The Rockefeller Foundation, which has supported Sir Robert's research in organic chemistry since 1933, continues this aid for the final four years before his retirement with a grant of \$30,000.

AMHERST COLLEGE

Biology

The Department of Biology at Amherst College provides a fine example of significant research at a

relatively small liberal arts college. Aided by the Foundation since 1934, the department has developed a program focused on genetics and experimental embryology.

Current support of \$47,700 for a period of five years will aid various men in the department. Active in genetics research at Amherst are groups under Professor Harold H. Plough, Professor Taylor Hinton and Dr. Philip T. Ives. Professor Plough is interested in bacterial genetics and is working with the food poisoning bacteria, *Salmonella typhimurim*. Professor Hinton is carrying on the long-standing tradition of drosophila work at the college, his investigations including eye tumors in drosophila and maintenance of the drosophila stocks. Dr. Ives is occupied with the population genetics of this same fruit fly. In the field of experimental embryology, research is under the direction of Professor Oscar Schotté, a former Rockefeller Foundation fellow. Professor Schotté has studied the regeneration in amphibians of body sections removed by accident or surgery.

MARINE BIOLOGICAL LABORATORY, WOODS HOLE

Experimental Biology

In the more than 60 years of its existence, the Marine Biological Laboratory at Woods Hole, Massachusetts, has become the nation's chief center for summertime research and training in biology. Here students and scientists from all over the world come together for a period of teaching, investigation and interchange of ideas; here also younger biologists are

given an opportunity to do mature research. In the reorganized course in marine physiology, each student last summer was required to prepare, analyze and report as many as possible of the physical characteristics of a protein which he had himself procured from a marine animal. Such study-research combinations have proved valuable in many instances.

The facilities at Woods Hole, including the extensive biological library, are among the best in the country. Participants in the laboratory's program have at their disposal the full complement of equipment necessary for present-day biological research, and over 3,000 marine forms are available as specimens for experimentation.

Rockefeller Foundation collaboration with the laboratory dates back almost 30 years. A grant of \$250,000 in 1948 provided \$150,000 to modernize one of the laboratory buildings and \$100,000 for general research support over a period of five years. The large numbers of people making continual use of the apparatus, plus the tendency of certain equipment to wear out rapidly in the atmosphere of a marine environment, necessitate relatively frequent renewal of the equipment. The current Foundation grant of \$75,000 for two years is to aid in the modernization or replacement of ineffective apparatus and the installation of new facilities.

ZOOLOGICAL STATION OF NAPLES

Marine Biology

The European counterpart of the Marine Biological Laboratory at Woods Hole is the Zoological

Station of Naples. For four decades specialized technical facilities, a wealth of marine specimens and an outstanding library have attracted scientists from all parts of the globe. The station serves as a clearing-house where visitors from many nations establish and periodically renew contacts with their scientific colleagues and exchange theories and information in their common field.

Physical damage during the war was not severe. Annual symposia have been resumed and foreign organizations and individuals are once again renting "tables," or working spaces. Unfortunately there is a wide range in the dollar value of the rental fees because of the discrepancy between present-day currencies and the prewar levels on which the fees are still based. In order to avoid a sudden shifting of these rates to a more realistic and equitable level, part of a four-year grant of \$25,000 by The Rockefeller Foundation is allotted so that the process may be carried out gradually and yet the station may have the income it requires to maintain its services. A second portion of the grant is to be used for the purchase of equipment, and the remainder is for general expenses.

UNIVERSITY OF EDINBURGH

Carbohydrate Chemistry

Under the direction of Professor Edmund Langley Hirst, the Department of Chemistry at the University of Edinburgh, Scotland, is pursuing a broad program of research in carbohydrate chemistry. A detailed analysis is being made of the carbohydrate

concentration of grasses and straws, of the potential value of seaweed as a food source and of food crops and their preservation.

The Rockefeller Foundation in 1950 made a two-year grant of \$17,000 to the University of Edinburgh to furnish Professor Hirst with a Spinco analytical ultracentrifuge with accessories. The present grant of \$2,500 is to supplement this sum, because the cost of the equipment has increased since the time of the original appropriation.

FEDERAL TECHNICAL INSTITUTE, ZURICH

Chemistry of Natural Products

The organic chemistry of natural products is currently under investigation at the Federal Technical Institute in Zurich, Switzerland. Modern theoretical concepts, as well as the latest technical developments, are put to use in these intensive studies stressing compounds of physiological importance.

About a dozen compounds have been isolated from the urine of pregnant mares; the structure of these compounds indicates that they are degradation products of the carotinoids, a group of plant pigments deposited in animal tissues. The carotinoid metabolism is believed to be highly important, and it is planned to study this mechanism on as broad a basis as possible.

The best way of demonstrating the relationship between the compounds isolated from urine and the carotinoids is by feeding "labeled" carotinoids to test animals and investigating the carbon isotope compounds extracted from the urine. An alternative

method is by feeding synthetic carotinoids with specific labeled atoms to test animals, and then following the biological degradation step by step. The group under the direction of Professor Vlado Prelog at the Federal Technical Institute intends to explore both procedures. Their experience with the C_{18} urine compounds, combined with the new tracer techniques, should make possible significant advances in the field of physiological research.

In support of the work under Dr. Prelog, The Rockefeller Foundation in 1951 made a grant of \$54,000 to cover a period of four years.

HARVARD UNIVERSITY

Biochemistry of the Trace Elements

Minute quantities of the trace elements, among them iron, cobalt, copper and zinc, play an important role in both animal and plant disease. The wrong proportions of these substances in an animal or human diet may lead to pathological symptoms or to actual disease; a deficiency of trace minerals in the soil means fewer and inferior plants. When the natural balance of the soil is upset in this way, plants, animals and eventually human beings are affected.

Due to the low concentrations in which the trace elements occur, it has been extremely difficult to study them quantitatively. Now, however, accurate methods have been developed which are applicable for even very small amounts. Instrumental in this advance has been Dr. Bert L. Vallee, now associate in medicine at the Harvard Medical School. Two

years of intensive work at the Massachusetts Institute of Technology resulted in the development and refinement of spectrographic techniques to the point where simultaneous quantitative and qualitative determinations can now be made on some 20 to 30 elements occurring in amounts as small as one ten-millionth of a gram per gram of specimen.

Because of its bearing on medicine and biology, as well as other fields, a large-scale comprehensive program on the trace elements has been set up at Harvard University under Dr. Vallee's direction. A grant of \$100,000 by The Rockefeller Foundation will aid in financing this venture, which is to be carried out in collaboration with the Massachusetts Institute of Technology and the Peter Bent Brigham Hospital, the latter furnishing space for new laboratory quarters for the project.

The proposed program on the occurrence and function of trace elements in biological systems is divided into three areas:

- 1) Measurement of the occurrence of trace elements in human tissue (including body fluids) in normal and pathological states, using the facilities of the new laboratory in connection with the clinical interests and work at the Peter Bent Brigham Hospital and elsewhere.

- 2) General application of the new techniques to fundamental biological problems of interest to the various departments of the medical school and the university. The proposed laboratory will provide instrumentation and special skills for use by the several departments on a collaborative basis.

- 3) Further development and refinement of spectrographic and other analytical techniques, to be carried on

jointly with the Massachusetts Institute of Technology, utilizing the facilities of the spectroscopy laboratory there. The results will be applied to the biological program in the new laboratory.

An active program in enzymology is contemplated also, for there are indications that the physiological activity of trace elements may be explained in terms of their association with proteins, which may or may not have enzymatic activity.

COLUMBIA UNIVERSITY

Immunochemistry

The science of immunology was originally concerned almost wholly with the resistance of the human body to disease. But in striving for a more complete understanding of the mechanism of immunity, investigators soon directed their attention to the specific biological and chemical reactions that occur when certain foreign materials are introduced into the body. When bacteria, for instance, are present in the body the toxins they secrete set into motion a sequence of chemical actions which result in the production of antitoxins to neutralize the adverse effects of the toxins.

Dr. Michael Heidelberger of the Department of Medicine at Columbia University is a leading authority on the chemical aspects of this protective process. By applying quantitative techniques, he has been able to incorporate the immunological reaction between antigens and antibodies into the comprehensive field of protein chemistry.

During the past few years, Professor Heidelberger has been studying the subsidiary substances manufactured by the body to combat bacteria. One of these is called complement, and this has proved to be a highly unstable and complex material. Of the four, and possibly more, components of human complement, one has been separated out in pure form. Dr. Heidelberger is attempting to adapt similar methods for isolating the other constituents of both human and guinea pig complement. A thorough, quantitative analysis of these substances would considerably advance present knowledge of the mechanism of complement fixation.

The Foundation has aided Dr. Heidelberger's research at Columbia since 1946. This year it continues its support with a three-year grant of \$42,000.

HARVARD UNIVERSITY

Chemotherapy

Dr. Louis F. Fieser, professor of organic chemistry at Harvard University, has long been an active research worker in the field of chemotherapy. During World War II he worked on antimalarial agents. Since that time he has been studying the synthesis of various chemicals having therapeutic activity and the relationship between the physiological action of a chemical substance and its molecular structure.

The Rockefeller Foundation continues its support of these studies in steroid chemistry with a grant of \$15,000 for the coming year. Projected research under Dr. Fieser concerns techniques of chemical

oxidation as related to biological processes, development of a synthesis of cortisone from cholesterol, research on the metabolism of cholesterol and its newly isolated companion lathosterol, and the production of synthetic alkaloids which may prove effective in controlling hypertension.

UNIVERSITY OF BIRMINGHAM

Biochemical Studies

The Rockefeller Foundation has made a three-year grant of \$13,500 to the University of Birmingham, England, in support of research in biochemistry under the direction of Professor Maurice Stacey. The university has one of the largest chemical laboratories in Great Britain; work in the organic and biological chemistry section there includes investigations on the chemistry of the nucleic acids and fundamental studies on the carbohydrate groups of various tissue components. Practical problems concerning the chemistry of blood plasma substitutes, cortisone synthesis, and drug and antibiotic action also receive attention.

UNIVERSITY OF OSLO

Plant Physiology and X-ray Crystallography

A two-year grant of \$15,000 has been made by The Rockefeller Foundation to the University of Oslo, Norway. Of this sum, approximately \$8,000 is to be used for the construction of temporary laboratory and greenhouse space for the plant physiology group directed by Professor Gunnar Ålvik. The remainder of the Foundation grant is for the purchase

of equipment needed by Professor Odd Hassel and his co-workers in the Department of Chemistry. This group is studying molecular structure by means of X-ray crystallography and is especially interested in the stereochemistry of compounds containing six-membered rings of the cyclohexane and pyranose type.

AGRICULTURE

PROGRAMS IN MEXICO AND COLOMBIA

MEXICAN AGRICULTURAL PROGRAM

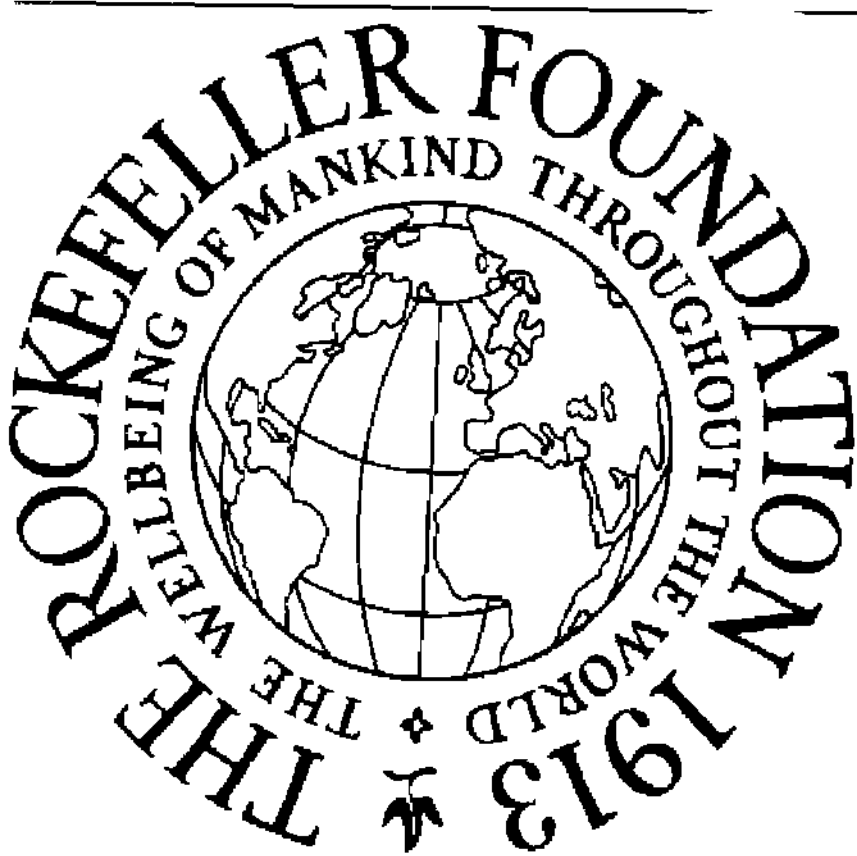
In 1951 further progress was made by the Mexican Agricultural Program in improving the productivity of Mexico's agriculture, and in turn — it is hoped — the nutrition and health of her people. With the advance of both research and training activities, the coming year, the tenth since the inception of the project, will find the Mexican program more effective as one of the centers for all of Latin America in both these phases of its work.

The program of corn and wheat improvement continued during the year, with the latter assuming particular importance due to a new type of stem rust which originated in the spring wheat regions of the United States and Canada during 1950 and spread rapidly into Mexico in 1951. Fortunately, this occurred late enough to prevent serious damage to the fall-sown wheat crop, but it did emphasize the importance of developing additional varieties of wheat which would be resistant to this disease, not only in Mexico but further north as well.

Seventy per cent of all the wheat grown in Mexico during 1951 was produced from the improved varieties bred under the supervision of the program's Office of Special Studies. One of these varieties, known as Supremo, is suitable for summer culture; planting during this season had been previously thought impossible because of the extreme moisture which is so conducive to rusts. Supremo and other summer varieties were established in approximately 30,000 acres during 1950, adding substantially to the total annual wheat production of Mexico. Between 80,000 and 95,000 acres were planted for the 1951 summer crop.

The development of higher-yielding corns for the tropics and for certain high mountain valleys of the central plateau and northern Mexico was stressed during 1951, extending the previous work on improving corn for the high plateau area of central Mexico. It is intended to continue the development and distribution of the new varieties during 1952.

The hybridization of beans, a time-consuming procedure, has progressed in an attempt to evolve breeds which are high yielding and at the same time resistant to disease and pests. The nutritional qualities of the improved varieties are being determined in collaboration with the National Institute of Nutrition. In the interim, the practice has been to distribute immediately the seeds of the best varieties currently available. Demonstration plots serve to instruct the local farmers in improved cultural practices and the use of insecticides so that beans, second only to corn in importance to the Mexican diet, may



Cross pollination of
wheat at Chapingo,
Mexico

Photograph Excised Here



Cross pollination
wheat at Chapm
Mexico

Photograph Excised Here



Photograph Excised Here

be grown on a more advantageous commercial scale. The entomology program has stressed control of the leading bean pests, as well as the testing of experimental insecticides.

Complementing the breeding program, investigations by the soils division follow three principal lines: experiments with commercial fertilizers on the crops being investigated by the program; crop rotation studies; and the trial introduction of legumes, grasses, sorghums and soybeans to be used for food, forage or rotation purposes.

The work of the plant pathology division has demonstrated that seed potatoes can be produced readily in Mexico as soon as the important potato diseases are controlled, thereby freeing the country of the necessity for importing this crop. Notable progress has been made in this field, and also in curbing the late blight which hinders large-scale tomato production.

A new project also designed to improve the Mexican diet is the testing and evaluation of new varieties of vegetables imported from the United States and other areas. Fertility problems and techniques for commercial seed production are under investigation, with the hope of ultimately expanding the production of vegetables in Mexico and popularizing their use among individual farmers.

In regard to the training portion of the Mexican Agricultural Program, during 1951 eight young Mexican agricultural scientists received scholarships for postgraduate study in the United States. Other scholarships were granted by the Foundation to graduates

of South American agricultural colleges, enabling them to study in Mexico (see pages 289 to 290).

The publication program has advanced this year, with six agricultural bulletins completed and distributed during 1951:

Wellhausen, E. J., L. M. Roberts, and E. Hernández X., in collaboration with P. C. Mangelsdorf. *Razas de Maíz en México, su Origen, Características y Distribución*. Folleto Técnico No. 5, Oficina de Estudios Especiales, Secretaría de Agricultura y Ganadería, México, D. F., April 1951. 237 pp.

Since 1943 workers in the Mexican Agricultural Program have collected varieties of corn from all parts of Mexico. The 2,000 varieties now in this collection have been intensively studied, and the classifications and evolutionary factors indicated by the collection are here discussed.

Wellhausen, E. J. *El Maíz Híbrido y su Utilización en México*. Folleto Técnico No. 6, Oficina de Estudios Especiales, Secretaría de Agricultura y Ganadería, México, D. F., April 1951. 57 pp.

The development of hybrid corn is explained. The author discusses strong points and deficiencies with respect to the use of hybrid corns in Mexico.

Rupert, J. A. *Rust Resistance in the Mexican Wheat Improvement Program*. Folleto Técnico No. 7, Oficina de Estudios Especiales, Secretaría de Agricultura y Ganadería, México, D. F., April 1951. 44 pp.

After long search, two high-yielding, rust-resistant wheats were selected for increase and distribution, and for the first time in Mexico it was possible to produce wheat in the summer rainy season. Hybridization offers the greatest promise in continuing to develop improved varieties for Mexico.

McKelvey, J. J., A. C. Smith, J. Guevara C., and A. Cortés I. *Biología y Control de los Picudos del Género Apion que Atacan al Frijol en México*. Folleto Técnico No. 8, Oficina de Estudios Especiales, Secretaría de Agricultura y Ganadería, México, D. F., September 1951. 42 pp.

Apion pod weevils periodically cause severe damage to beans in certain regions of Mexico. According to surveys conducted from 1946 through 1949, the weevils can be expected to occur, though in varying infestation, wherever beans are grown during the rainy season. This publication discusses the ecology of the pests and methods of preventing and combating them.

Meléndez de la Garza, M. de los Angeles. *Reacción de Frijol en México a Tres Razas de Colletotrichum lindemuthianum*. Folleto Técnico No. 9, Oficina de Estudios Especiales, Secretaría de Agricultura y Ganadería, México, D. F., December 1951. 29 pp.

The resistance of various Mexican bean varieties to the alpha, beta and gamma races of *C. lindemuthianum* was tested. Temperature and humidity were found to be vital factors affecting anthracnose infection.

Primera Asamblea Latinoamericana de Fitoparasitología. Folleto Misceláneo No. 4, Oficina de Estudios Especiales, Secretaría de Agricultura y Ganadería, México, D. F., October 1951.

The proceedings of the first Latin American symposium on plant pests and diseases are summarized, and the contents of the various papers presented there are given.

The circulation of these publications and the increasing number of fellows returning to their own countries have stimulated a great many requests for

technical assistance and for experimental lots of the new seed varieties. Samples have been sent all over Latin America, as well as to Africa, Canada, the Caribbean Islands, India, Israel, the Philippine Islands, the United States and much of Europe. Valuable data have been obtained on their behavior and growth in these countries. The exchange of information has been furthered also by the visits of over 2,000 persons to the Mexican project in the course of the year.

The Rockefeller Foundation continued its financial collaboration with the Mexican government by means of a supplementary appropriation of \$3,048 toward 1951 expenses of the agricultural program and a grant of \$319,100 to be expended in 1952. An additional fund of \$2,000 was appropriated to defray incidental administrative expenses in connection with the work. It is not planned to expand the Mexican program exclusively as a local project, but rather to develop further its functions as a center for the training of Latin American personnel and for the development and distribution of improved varieties of crop plants. To avoid what is likely to be the greatest stumbling block in this expansion, a special appropriation of \$60,000 was made by The Rockefeller Foundation to provide for the addition of six new staff members to the Mexican Agricultural Program. These American scientists will be trained for active participation in the program in Mexico, but with the understanding that they will subsequently be assigned elsewhere as needed, in this way spreading to other countries in the hemisphere the

techniques and knowledge acquired under the operating program in Mexico.

LATIN AMERICAN AGRICULTURAL SCHOLARSHIPS

To help in training young agricultural scientists, one of the two major goals of the Mexican Agricultural Program, The Rockefeller Foundation since 1945 has made a series of grants in aid and appropriations for scholarship purposes. The beginning was a modest fund enabling one or two of the outstanding members of the graduating classes of the Faculty of Agronomy at Medellín, Colombia, to go to Mexico as apprentices for a year of intensive practical training. The success of the initial experience encouraged the Foundation two years later to extend a similar opportunity to graduating class members of the second constituent school of the National University of Colombia, the Faculty of Agronomy at Palmira.

Last year requests for the same type of assistance were received from schools in other Latin American countries including Bolivia, Brazil and Peru. A Rockefeller Foundation grant of \$50,000, made previously but available through 1953, provided a year of training in Mexico for approximately 24 Latin American scholars; five students from the above three countries were awarded scholarships for the current year, in addition to the Colombian students named under another grant. Again the value of the Mexican Agricultural Program in serving, in effect, as an international graduate school of agriculture has been proved. Agricultural problems throughout Latin

America are similar, and there is no language barrier as all the work is conducted in Spanish.

Now that the initial, experimental stage of the scholarship program has been successfully passed, the need for unity in these activities has become evident. Instead of making a series of relatively small grants to individual institutions, all scholarship functions pertaining to the Mexican program are to be combined in a single appropriation. The 1951 comprehensive grant of \$53,000 extends through June 30, 1954 the scholarship funds of the institutions in the above three countries and of the two Colombian Faculties of Agronomy; at the same time there is a flexible provision for an average of four undesignated scholarships annually during the same period. The latter are to be awarded to graduates from other Latin American agricultural colleges or to young men in official posts in research institutes, state secretariats or ministries of agriculture — depending on the qualifications of the individual candidates.

INTER-AMERICAN SYMPOSIUM ON PLANT BREEDING, PESTS AND DISEASES

The international aspects of the Mexican Agricultural Program were enhanced in 1949 by an Inter-American Symposium on Plant Breeding held in Mexico City under the auspices of the Office of Special Studies of Mexico's Secretariat of Agriculture and Animal Industry. Specialists in plant breeding from Central and South America attended to present papers, to exchange information and to visit various field stations. The success of the 1949 conference

stimulated a similar symposium the following year on plant pests and diseases. It was again held in and near Mexico City.

Beyond the technical discussions and the field trips, the 1950 meeting had special merit in its planning for future work. The value of the symposium as a cooperative technique was clearly recognized, and the consensus of opinion was that such a conference should be held approximately every two years. A joint meeting was recommended which would bring together the plant breeders and the plant pest and disease specialists. The Brazilian delegates suggested that the next symposium, scheduled for early 1952, take place in their country under the joint auspices of Brazilian agencies and the Office of Special Studies.

The Rockefeller Foundation's grant of \$15,000, available until December 31, 1953, again will facilitate the travel of delegates to the conference and will aid in meeting costs of publishing the proceedings of the symposium. Any unexpended balance will be used for expenses of the continuing joint committee which was set up to keep members informed of important developments, promote the exchange of materials and data, and plan future meetings.

STATE OF MEXICO — RESEARCH, DEMONSTRATION AND EXTENSION PROGRAM

Supplementing its Mexican Agricultural Program, The Rockefeller Foundation has undertaken to participate directly in the planning and development of a six-year agricultural project for the State of Mexico.

At the request of the newly elected governor of the state, Salvador Sánchez Colín, himself a trained agricultural scientist, a collaborative program has been initiated. The Foundation has made an appropriation of \$100,000 for the first three years of the project.

An agricultural office for administrative purposes is being established near Toluca, the capital city of the state. Under the supervision of a director and a subdirector, this office will handle fiscal matters, keep records and disseminate general information. In addition, the state has purchased 120 acres of land near Toluca on which an experiment, demonstration and extension station will be set up. It will be directed by a chief and subchief and will keep in close contact with all agricultural agencies within the state, particularly the main research center in Chapingo.

The State of Mexico, comprising over 9,000 square miles, has been zoned into six areas. Each of these will have an extension agent located in its principal city. These men, corresponding to the American county agents, will supply liaison between the farmers and the state agricultural authorities; they will give advice on new varieties of seeds and new techniques for soils management; and they will help organize large-scale seed raising programs, field days, meetings and possibly short courses.

The suggestion has been made that a practical school of agriculture be established adjacent to the demonstration station at Toluca. Accepted in principle, the school is still far from being a reality, but it

is hoped that at least a small group of students may be in residence by early 1953.

In addition to the land already purchased, the State of Mexico is supplying all the base salaries and the general facilities of the experimental station, and will meet construction costs of the proposed elementary agricultural school. The Foundation's grant is a flexible contribution toward development of the experimental station (machinery, field supplies, seeds and the like), travel expenditures and direct support of certain technical personnel. Also, preliminary surveys in 1952 will help determine the most satisfactory approaches to existing problems.

If this project can be successfully developed it may well become the pattern for agricultural organizations in other states throughout the republic. And it may be that the program can ultimately be extended to include domestic science, public health and sanitation, to mention only a few possibilities. By comprehending these additional fields, the State of Mexico may become a pilot plant for a coordinated "human ecology" approach to the over-all problems of food, health and education in underdeveloped countries.

COLOMBIAN AGRICULTURAL PROGRAM

The notable success of the Foundation's collaboration with the Mexican government has already been matched to some extent by its agricultural program operating along similar lines in Colombia. With the actual work started in mid-1950, the year 1951 has been one of unusually rapid progress. From the

President and the Minister of Agriculture on down, the Colombians have enthusiastically supported the project. In fact, the results this year were so encouraging that the Colombian government allotted the sum of 200,000 Colombian pesos beyond its original budget commitment, and The Rockefeller Foundation met this expression of support with additional appropriations of its own in the amounts of \$15,000 and \$600 for expenditure during 1951. A report of the first year's work, through May of 1951, was submitted to the Colombian Minister of Agriculture and was published in the June issue of the *Revista Nacional de Agricultura*.

Like the Mexican Agricultural Program, the Colombian program is predicated upon the importance of corn and wheat, and has been able to draw upon its predecessor program in Mexico not only for technical experience but also for improved seed stocks. Local and imported varieties of corn have been tested for their suitability to the different altitudes in Colombia, and cooperation has been established with similar projects already under way, particularly those at the Tulio Ospina Experimental Station in Medellín. Both pure and hybrid corns have been evaluated, with each strain numbered under the generic name "Rocol" — for Rockefeller and Colombia. As in the Mexican program, the best available varieties have been distributed in the interim, with the idea of replacing them as quickly as possible with still further improved varieties. It is planned to intensify the development of improved strains for low temperatures, particularly to find

varieties suitable for the Sabana, Bogotá and similar areas.

About 7,000 strains of wheat have been examined in studies closely paralleling those of corn. Considerable progress has been made in the development of satisfactory rust-resistant breeds, the chief research center being near Bogotá. Wheat, unlike corn, favors the cooler, higher climates rather than the warmer, lower ones. In the past, 90 per cent of the entire country's production has come from only three departments, so that the problem now is to breed strains equally well adapted to the other regions.

In addition to the corn and wheat activities, work has gone ahead on other small grains, beans and forage crops. Important basic diseases and plant pests are to be investigated, and an extension of operations into the realm of animal husbandry is being considered. In view of the rapidity with which the work is expanding and in contemplation of future projects, the government of Colombia, with Rockefeller Foundation collaboration, is replacing the present experiment station with a new and greatly improved one, to be called El Rubi.

The opportunities seem so promising that the Foundation's contribution for 1952 is on a level considerably higher than originally contemplated—\$120,000 for the calendar year. This expansion will be largely in terms of personnel. An entomologist, considered in the earlier plans, will now be added to the staff; in addition, there will be a soils scientist, a plant pathologist and, in response to a special request of the Colombian government, a potato

specialist. The current Rockefeller Foundation grant will be matched in equal amount by the government of Colombia.

AGRICULTURAL PROGRAMS — TEMPORARY SCIENTIFIC AIDES

For some years it has been the policy of the Mexican Agricultural Program to employ, for special purposes and on a temporary basis, young United States agricultural scientists at about the level of the Master's degree. Nine persons thus far have been appointed as temporary scientific aides, representing such fields as botany, genetics, entomology and agronomy, and three of these men are active in Latin America at present. The appointments up to now have been included as part of the budget of the Mexican Agricultural Program, but the success of this policy in getting special jobs done and in directing the interest of promising young scientists toward Latin America has made it desirable to consider assignment of these aides as a separate activity. Accordingly, The Rockefeller Foundation has appropriated \$40,000 to cover such appointments for a period of three years.

A second Rockefeller Foundation grant of \$30,000 for three years has been made for the appointment of special temporary scientific aides in connection with the Foundation's Mexican and Colombian agricultural programs. This category refers to mature, recognized specialists in agricultural science who occupy responsible positions in the United States or in Europe. These men spend a relatively short

period, usually not more than three months, in Mexico, Colombia or other countries on special problems important to Latin American agriculture, either locally or in a broader sense. Several individuals, such as Dr. R. E. Karper of the Texas Agricultural Station, Dr. J. J. Christensen of the University of Minnesota, Dr. E. S. McFadden of College Station, Texas, and Dr. B. B. Bayles of the United States Department of Agriculture, have already been invited to Mexico on this basis and the results have been extremely encouraging.

The immediate benefit to the Latin American programs derived from the presence of these two types of specialists is obvious. But there are also the long-range gains. The first group of men will form a roster of young scientists with Latin American experience who can be called upon for special assignment when needed; the second group also will be available when needed for special assignment but in addition will be able to train younger men for careers in Latin America. In some cases these men will be in a position to place at the disposal of the Foundation's operating programs facilities which would otherwise not be available.

AID TO RESEARCH AND TEACHING

MINISTRY OF AGRICULTURE OF COLOMBIA

Experimental Greenhouse

A portion of the Colombian Agricultural Program's wheat-breeding activity is under the direction of Juan Orjuela Navarrete, a Foundation fellow in

1947-1948. He is now investigating diseases of wheat varieties at the Francisco José de Caldas Experiment Station of the Ministry of Agriculture. Several years ago Mr. Orjuela constructed a small greenhouse at the station; however, with the rapid expansion of the agricultural work in Colombia the greenhouse no longer suffices. In a greenhouse where temperature and ventilation can be properly regulated, resistance to certain diseases, for instance, can be measured in three weeks instead of the entire growing season required if the plants are grown in field plots. The Ministry of Agriculture is contributing \$8,000 toward the estimated cost of a new greenhouse, with The Rockefeller Foundation supplying the balance of \$15,000.

NATIONAL UNIVERSITY OF COLOMBIA

Faculty of Agronomy, Palmira

The National University of Colombia includes two Faculties of Agronomy. The older of these agricultural colleges is at Medellín; the second, formerly at Cali, has recently moved to Palmira.

The latter college was started independently in 1934 as a purely local venture. During the early years the faculty was part time, the student body small and the facilities pitifully inadequate. Nevertheless, this embryonic college was located in the center of a rich agricultural area, and politically influential persons took an interest in its development. The school survived and a gradual expansion process became evident. In 1946 it was affiliated with the

National University and shortly thereafter acquired a new location near Palmira, 25 miles from the city of Cali and adjoining the best national agricultural experiment station in Colombia.

With the erection of the first building on the new site, the enrollment at Palmira increased considerably and now includes students from even the most distant departments of the country. There are seven professors on full-time salaries and a number of part-time teachers who are investigators at the near-by experiment station. Relations with the community and the farmers of the region are being strengthened, and the school is even providing competition for its older sister college at Medellín.

The Rockefeller Foundation has aided the Cali-Palmira Faculty of Agronomy since its early days, first on a modest basis and then on a higher level of support. It has given fellowships to enable outstanding graduates to study under the program in Mexico and last year took exceptional action in contributing toward the cost of erecting a student dormitory. This year two Foundation grants were made: the first, an appropriation of \$40,000, is toward the cost of equipment for a second scientific laboratory building; the second consists of \$15,000 for teaching and research facilities, for study trips of staff members and to assist in bringing foreign professors to the school. It is hoped that this assistance will help strengthen the faculty as an integral part of the broad plan for intensified training and research under the Colombian Agricultural Program.

UNIVERSITY OF SÃO PAULO

Faculty of Veterinary Medicine

The sum of \$14,500 has been appropriated by The Rockefeller Foundation to the University of São Paulo, Brazil, toward the purchase of equipment and supplies for the work of two professors in the Faculty of Veterinary Medicine.

The first of these men, Dr. João Soares Veiga, is professor of special animal husbandry and dean of the faculty. He specializes in climatic physiology, or the acclimatization of cattle to tropical environments, and has recently returned to Brazil from travel in the United States and Latin America on a Rockefeller Foundation fellowship. The second scientist is Professor Paschoal Mucciolo, also a recent Foundation fellow. Dr. Mucciolo is professor of food inspection and is particularly interested in the bacteriology of meat. The Foundation's grant will aid both of these men in investigating new ideas and approaches evolved in the course of their fellowship experience.

UNIVERSITY OF NORTH CAROLINA

Plant Genetics and Statistics

Plant breeders everywhere are concerned with the most effective methods of bettering their crops, particularly with respect to characteristics such as yield which are of economic importance. It is also desirable that plant breeders know the amount of improvement to be expected within a specified

period of time and know how to maintain the rate of improvement over long time intervals.

These problems pose complex statistical questions and involve numerical analyses of masses of data. The Institute of Statistics at the University of North Carolina, which, with aid from the General Education Board, has developed into one of the strongest centers for pure and applied statistics in the United States, is collaborating with the Division of Biological Sciences of the North Carolina State College of Agriculture and Engineering (part of the university). A program of theoretical and applied research has been formulated to elucidate some of the genetic mechanisms which underlie and control inheritance in plants.

Renewing aid which began in 1949, this year The Rockefeller Foundation has made a grant of \$25,000 to the University of North Carolina toward its program of research in mathematical and experimental genetics.

OTHER FIELDS

NATIONAL RESEARCH COUNCIL

Office of Scientific Personnel

Early in the last war, the emergency demands of government agencies on various professional groups of the physical and mathematical sciences made it expedient to organize under the National Research Council a bureau known as the Office of Scientific Personnel. As a free representative of science in the United States, this agency has become a center for

services of an investigative and advisory nature. Its activities, including the establishment of a *Key Roster of Scientific Personnel*, have dealt with the supply, training and utilization of scientific personnel throughout the country.

The Rockefeller Foundation, which from 1942 on has given direct and indirect aid to the Office of Scientific Personnel, this year continues its support with a six-month grant of \$9,000.

UNIVERSITY OF CHICAGO

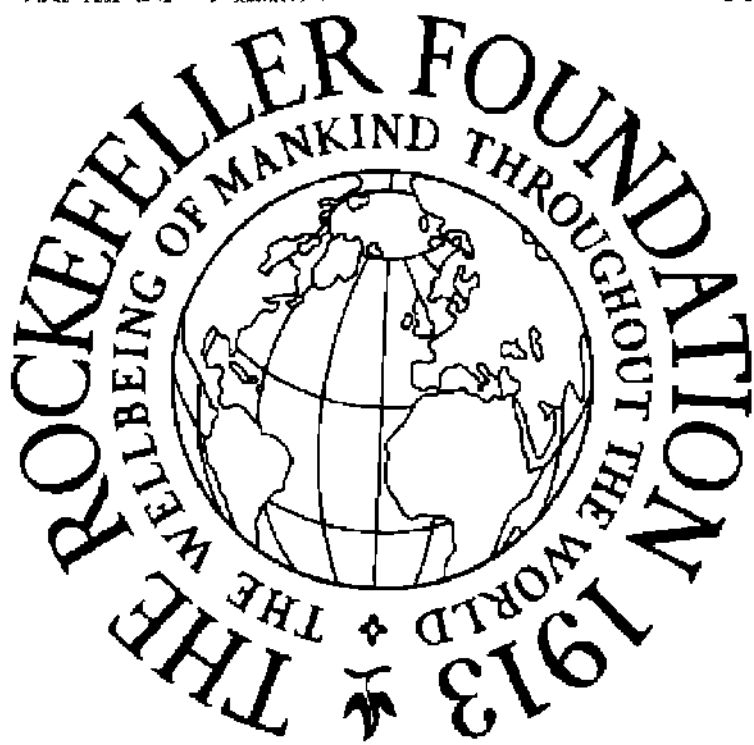
Applied Statistics

There is a serious gap today between the existing knowledge in mathematical statistics and its useful application to practical problems. In all fields there are many investigators who think of statistics as a method of criticizing and evaluating work already done, not realizing that this function is secondary to that of contributing to the effective design of experiments and other exploratory programs.

To help remedy this situation, the University of Chicago has originated a program of advanced training in applied statistics for three suitably qualified individuals per year. These are to be scholars on a postdoctoral level with a definite program of research which would be facilitated by advanced statistical techniques. The trainees will be selected one each from the biological, physical and social sciences and given a full year of intensified statistical study. In addition, there will be an unusual opportunity for interdisciplinary communication, for mutual help and stimulation by the interchange of



Photograph Excised Here



Photograph Excised Here

Standard Oil Co., N. J.

Industrial water needs are under study by the Conservation Foundation; shown above is the water reservoir of an oil refinery

Wheat breeding at the Francisco José de Caldas Experiment Station near Bogotá, Colombia



Photograph Excised Here

ideas and techniques — with statistical methodology as the coordinating factor.

The University of Chicago is in an exceptionally good position to provide this sort of training, as it has a strong statistics group and an urgent sense of the necessity of fostering a closer intimacy between the statistical theorist and the practical researcher. The Rockefeller Foundation is supporting this program for an initial five-year period with a grant of \$75,000, sponsored jointly by the Division of Natural Sciences and Agriculture and the Division of Social Sciences.

THE CONSERVATION FOUNDATION

Utilization of Natural Resources

The Conservation Foundation of New York is an independent group founded in 1948 under the auspices of the New York Zoological Society for the purpose of initiating and advancing research and education in the entire field of conservation — soil, water, forests, vegetation and wildlife. Its president is Mr. Fairfield Osborn.

The Conservation Foundation, which in 1949 received a three-year Rockefeller Foundation grant of \$75,000, this year is aided by two grants. The first of these is in the amount of \$117,000, to be available during the period ending December 31, 1952, of which \$15,000 will supplement the administrative budget.

The largest portion of the grant, \$70,000, is to be used for research on water resources. The problems are to some extent scientific and technical. But to

a much larger degree they involve the short-range and long-range interests, and often the conflicting interests, of communities, political organizations and powerful industries. The Conservation Foundation seems to be in a good position to carry out exploratory studies to define certain problems, indicate their interrelationships and bring the necessity for action before the appropriate groups.

In December of 1950 a brochure, *Water in Industry*, was prepared in collaboration with the National Association of Manufacturers, and this year a volume entitled *The Conservation of Ground Water* was published. Further studies are to be made on industrial water needs to help in planning water utilization and to encourage economical use in shortage areas. Investigations are also to be made on the effect of vegetative cover on water yield, and on how agricultural practices or the manipulation of forest cover can influence water conservation. A third study concerns the possibility of converting salt water to fresh water, and there have in fact been proposals before the Congress for federal financing of pilot plants to determine the feasibility of such a program.

The sum of \$20,000 has been designated for a preliminary survey of the productive power of the ocean's biological forces. Since less than 2 per cent of the protein currently used in human consumption is taken from marine sources, a thorough study of these virtually untapped resources may yield economically significant results.

In addition to its research projects, the Conservation Foundation has an active educational program.

Audio-visual facilities in the form of films and recordings, some directed particularly at elementary and high school students and at commercial firms, are nearing completion or are already available for circulation to the public. The sum of \$12,000 is earmarked for the preparation of Spanish and Portuguese sound tracks for certain of these educational films so that they can be effectively distributed in Latin America.

The second 1951 grant made by The Rockefeller Foundation to the Conservation Foundation is toward preparation of the soil erosion survey undertaken in conjunction with the Food and Agriculture Organization (FAO) of the United Nations. Under the direction of Dr. Mark Baldwin of the FAO, the survey will eventually report on soil erosion throughout the entire world. The initial phase of the work, treating North and South America, is nearing completion, and it is to cover final costs that the sum of \$10,000 has been granted in addition to the funds already available under the 1949 Rockefeller Foundation grant.

GRANTS IN AID

In the Division of Natural Sciences and Agriculture a total of 105 grants in aid amounting to \$292,118 were made during 1951 from funds set aside for this purpose. The grants were distributed among projects and individuals in 23 different countries.

Of 58 grants for research, 50 were for equipment, salaries and other aid to studies in the general field

of experimental biology, including ten for genetics research and two for X-ray crystallography. Of the other eight, two were for calculating machines for research in physical chemistry; one for spectroscopic research in rare earth elements, the structure of heavy metals and physical problems of high intensity ion sources; one for research in the geography of Brazil; one for research on problems relating to the automatic mechanical translation of one language to another; and three to faculties of agriculture and veterinary medicine in Yugoslavia.

Among the 39 travel grants were four which were made to permit the organizers of small international symposia to invite a few participants, and one for an exchange of personnel between the Institute of Agronomy of the South, Pelotas, Brazil, and the Mexican Agricultural Program. Of the other travel grants, 19 were for visits of scientists from other countries to the United States or for expenses within the country in certain instances in which the scientists were already in the United States; two were for visits to more than one country, including the United States; six were for visits of scientists from the United States to other countries; and seven were for visits from one foreign country to another.

Eight other grants were for miscellaneous purposes which are described below.

GRANTS IN AID OF RESEARCH

ARGENTINA

Institute of Biochemical Investigations, Campomar Foundation, Buenos Aires; \$6,000 for equipment and supplies for research in enzyme chemistry under Dr. Luis F. Leloir, director

National University of Buenos Aires, Department of Chemistry, Faculty of Exact, Physical and Natural Sciences; \$1,500 for research in organic chemistry under the direction of Professor Venancio Deulofeu

AUSTRIA

University of Graz, Institute for Theoretical and Physical Chemistry; \$3,500 for study of structure of proteins and celluloses by means of X-ray diffraction analysis and the methods of ultraviolet and infrared spectroscopy; equipment for use under the direction of Professor Otto Kratky

University of Vienna:

Second Chemical Laboratory; \$3,000 toward research under the general direction of Professor Friedrich Wessely

Faculty of Medicine; 19,200 Austrian schillings, approximately \$768, toward research in population genetics under the direction of Professor Felix Mainx

BRAZIL

Institute of Biology, Bahia, State Secretariat of Agriculture, Industry and Commerce; \$5,000 for equipment and supplies for research in animal and plant pathology

University of Brazil, National Faculty of Philosophy, Rio de Janeiro:

Professor A. G. Lagden Cavalcanti; \$5,200 for equipment, supplies and research assistance in genetics

Dr. Hilgard O'Reilly Sternberg, professor of geography of Brazil; \$5,000 for equipment and supplies

University of Paraná, Faculty of Philosophy, Curitiba; \$2,480 toward equipment and supplies for research in genetics under Professor Newton Freire-Maia

University of São Paulo:

Faculty of Philosophy, Science and Letters, Department of General Biology; \$3,500 toward equipment and supplies for work in drosophila population genetics under Dr. A. B. da Cunha

School of Agriculture, Piracicaba; \$850 toward equipment and supplies for genetics research of Dr. Warwick Kerr

CANADA

McMaster University, Hamilton, Ontario; \$1,500 toward biochemical studies of plants under the direction of Dr. S. Kirkwood, professor of biochemistry

DENMARK

University of Copenhagen, Laboratory of Zoophysiology; \$3,000 toward equipment for research in the physiology of cell division under Dr. Erik Zeuthen

FINLAND

University of Helsinki, Department of Nutritional Chemistry; \$4,000 toward research in biochemistry under the direction of Professor Paavo Roine

FRANCE

Pasteur Institute, Paris; \$2,500 for a spectrophotometer for use under the general direction of Dr. Pierre Grabar, director of the Service of Microbial Chemistry

University of Marseille, Faculty of Sciences:

Laboratory of Biochemistry and Fats; \$6,500 toward equipment for studies of protein hydrolysis by chemical and enzymatic agents and organic chemistry of fats and fatty acids under Professor Pierre Desnuelle

Laboratory of Physiology; \$600 for supplies for research on the structure of proteins under the direction of Dr. Jacques Chouteau, Chef de Travaux Pratiques

University of Montpellier, Institute of Chemistry; \$1,000 for physicochemical studies of organic products under Professor Max Mousseron

University of Nancy, School of Industrial and Mineral Chemistry; \$1,000 for equipment for research under the direction of Professor Maurice Letort

University of Strasbourg:

The physics of macromolecules; \$300 for research under the direction of Professor C. L. Sadron

Institute of Biological Physics; \$800 for equipment to be used under the direction of Professor André Chevallier

University of Toulouse, Faculty of Science, Laboratories of Physical Chemistry; \$1,800 toward equipment for research in X-ray crystallography under the direction of Dr. H. Brusset

GREAT BRITAIN

Strangeways Research Laboratory, Cambridge, England; \$800 for equipment and supplies to be used under the direction of Dr. Honor B. Fell, largely for the biochemistry unit of the laboratory

University of Leeds, England; \$1,300 for two additional X-ray tubes for use under the direction of Professor E. G. Cox, Department of Chemistry

University of Manchester, England; \$650 toward equipment for research under the direction of Professor E. R. H. Jones, Department of Organic Chemistry

ITALY

University of Bologna, Institute of Comparative Anatomy; \$3,500 for research under Professor Pasquale Pasquini

University of Naples:

Institute of Biological Chemistry; \$2,500 toward materials for research under the general direction of Professor Gaetano Quagliariello

Institute of Genetics; \$5,000 toward equipment for research of Professor Giuseppi Montalenti

University of Padua, Institute of Zoology and Comparative Anatomy; \$2,500 toward construction of a cold room for research of Professor Umberto D'Ancona

University of Pavia, Institute of Genetics; \$2,500 for research of Professor Adriano Buzzati-Traverso

University of Rome, Institute of Comparative Anatomy; \$1,700 for research of Professor Alberto Stefanelli in comparative embryology

University of Turin, Institute of Human Anatomy; \$60 for equipment for research of Dr. Rodolfo Amprino in micro-anatomy (in addition to previous grant in 1950)

NETHERLANDS

University of Amsterdam:

Laboratory of Plant Physiology; \$2,500 for equipment for work under the direction of Professor A. W. H. van Herk

Zeeman Laboratory; \$1,200 for equipment for spectroscopic research in rare earth elements, structure of heavy metals and physical problems of high intensity ion sources under Professor C. J. Bakker

SWEDEN

University of Uppsala; \$1,200 for equipment to be used in X-ray crystallography by Dr. Einar Stenhagen in the Department of Biochemistry

SWITZERLAND

University of Basel:

Research in biochemistry under the direction of Professor Theodore Posternak; \$4,000 for equipment

Department of Physical Chemistry; \$880 for calculating machine to be used under the direction of Dr. Hans Kuhn

University of Bern, Institute of Mineralogy; \$880 for calculating machine to be used under the direction of Professor Werner Nowacki

YUGOSLAVIA

University of Belgrade, Faculty of Agronomy, Institute for Agricultural Chemistry; \$3,000 toward equipment for research under the direction of Professor Stevan Nikolic

University of Zagreb:

Faculty of Agriculture and Forestry, Institute for Plant Breeding and Genetics; \$1,000 for genetics research under the direction of Professor Alois Tavcar

Faculty of Veterinary Medicine, Institute of Histology; \$2,000 for equipment to be used under the direction of Professor Teodor D. Varicak

Faculty of Sciences, University Chemical Laboratory; \$3,500 for publications and equipment for research in biochemistry under the direction of Professor Kresimir Balenovic

UNITED STATES

Cornell University Medical College, Department of Public Health, New York; \$5,000 for research of Dr. Bernard D. Davis in biosynthetic pathways of bacterial mutants

Iowa State College, Department of Physics, Ames; \$6,000 for research of Professor Robert L. Sinsheimer in biophysics (molecular biology)

The Johns Hopkins University, Baltimore, Maryland; \$5,000 for amino acid studies by Professor Emeritus F. V. McCollum

National Bureau of Standards, Institute for Numerical Analysis, Los Angeles, California; \$5,000 for research of Dr. Harry D. Huskey on problems related to the automatic mechanical translation of one language to another

Northwestern University, Evanston, Illinois; \$5,000 for research in genetics of Professor George H. Mickey, Department of Biology

Oregon State College, Department of Chemistry, Corvallis; \$4,500 for research of Professor Vernon H. Cheldelin relating to the mechanism of action of Coenzyme A in aerobic phosphorylation

Polytechnic Institute of Brooklyn, Department of Chemistry, New York; \$4,000 for research on biological structure under Dr. Gerald Oster

Purdue University, Department of Biological Science, Lafayette, Indiana; \$5,000 for study of isolated flagella from a biochemical point of view by Professor Heinrich Koffler

Rutgers University, Department of Zoology, New Brunswick, New Jersey; \$5,000 for study by Professor Alan A. Boyden of evolutionary relationships using techniques of precipitin specificity on samples of blood proteins

University of California, Los Angeles; \$7,000 for equipment for study of the biochemical mechanism of the induction of flowering under the direction of Professor Karl C. Hamner

University of Chicago, Institute of Radiobiology and Biophysics, Illinois; \$6,300 for research of Dr. Leo Szilard on mutagenic effects of caffeine, nucleic acids and other purine compounds

University of Florida, Department of Biology, Gainesville; \$6,000 for research in animal ecology by Professor W. C. Allee

University of Michigan, Ann Arbor; \$5,000 for work of Professor G. B. B. M. Sutherland on investigating protein structure by means of infrared spectroscopy

University of Pennsylvania, School of Medicine, the John Herr Musser Department of Research Medicine, Philadelphia; \$6,000 for research in steroid chemistry by Professor Maximilian R. Ehrenstein

Virginia Polytechnic Institute, Department of Genetics, Blacksburg; \$5,000 for research by Professor Max Levitan
 Washington University, Department of Botany, St. Louis, Missouri; \$5,000 for research in genetics by Professor Barry Commoner

TRAVEL GRANTS

AUSTRALIA

Mr. Peter M. Nossal, University of Adelaide; \$350 toward expenses while in the United States to study available equipment for a biochemical laboratory

BELGIUM

Professor Christian de Duve, Department of Biochemistry, University of Louvain; \$700 for visits to universities and institutions within the United States

BRAZIL

Institute of Agronomy, Campinas, State of São Paulo Secretariat of Agriculture, Research Fund:

For stipend of Professor Frank Yates, Rothamstead Agricultural Experiment Station, England, while conducting a two-month series of seminars in statistics at the Institute of Agronomy; \$1,500

Allowance to enable Dr. Ahmes Pinto Viegas, head, Division of Plant Pathology, to gather information in Latin American countries for the *Index of South American Literature on Fungi*, and to study coffee diseases; \$1,500

Institute of Agronomy of the North, Belém, Brazilian Ministry of Agriculture:

For trip to India of Dr. Felisberto C. de Camargo, director, to select cattle for breeding program for Amazon Valley; \$2,000

For one year's experience in Latin America, chiefly at the Institute of Agronomy of the North, working on cattle program, for Dr. Charles E. Eastin, recent veterinary graduate of Ohio State University; \$3,575

Institute of Agronomy of the South, Pelotas; \$7,220 toward the exchange of scientific personnel with the Mexican Agricultural Program during a period of one year

COLOMBIA

Dr. Eduardo Mejía Vélez, Secretary of Agriculture for the State of Antioquia, and Dr. Luis Eduardo Posada, director, Tulio Ospina Experiment Station, Medellín; \$1,760 for visits to the Mexican Agricultural Program

Ministry of Agriculture and Animal Industry, Bogotá; \$800 for expenses of visit of Dr. Bonifacio C. Bernardes, director, Rice Experiment Station, Pôrto Alegre, Brazil, to advise and consult with the ministry on all aspects of rice production and marketing in Colombia

DENMARK

Dr. C. Barker Jorgensen, Laboratory of Zoophysiology, University of Copenhagen; \$800 for expenses of visiting marine biological laboratories in the United States

Professor Hakon Lund, Department of Chemistry, University of Aarhus; \$1,500 for visit to the United States to become familiar with the techniques of using stable isotopes in the synthesis of organic compounds

GREAT BRITAIN

Dr. V. E. Cosslett, Cavendish Laboratory, University of Cambridge, England; \$250 for visits while in the United States to observe work being done on electron microscopy

Alfred Tennant Cowie, National Institute for Research in Dairying, Reading, England; \$3,000 toward the cost of a visit to the United States, where he has been appointed a research fellow in surgery at Harvard Medical School

Dr. Dennis Gabor, Imperial College of Science and Technology, University of London, England; \$900 for expenses of visiting laboratories in the United States doing work in his special interests, chiefly electron dynamics and optics, communication theory and diffraction microscopy

Dr. Edna M. F. Roe, Chester Beatty Research Institute, London, England; \$700 for visits in the United States to centers of cancer research

Society for Experimental Biology; \$1,500 toward travel expenses of American scientists invited to take part in the symposium on structural aspects of cell physiology held in Bristol, July 1951

Professor J. Monteith Robertson, Department of Biochemistry, University of Glasgow, Scotland; \$250 for visits to centers of research in electron microscopy in the United States

GREECE

Dr. P. Critopoulos, assistant professor of plant pathology, University of Salonika; \$1,200 for extension of visit in United States to study plant diseases

IRELAND

Dr. George Mitchell, Department of Irish Archaeology, Trinity College, Dublin; \$2,500 to study collections dealing with Quaternary Era at various institutions in the United States

ITALY

Professor Pasquale Pasquini, director, Institute of Comparative Anatomy, University of Bologna; \$1,500 for a three-month visit to the United States to observe work in experimental embryology

PERU

Dr. J. Alberto Leon, director, National School of Agriculture, La Molina; \$1,900 for visits in South and Central America, Mexico and the United States

PORTUGAL

Dr. Luis Bramão, National Agronomical Station, Lisbon; \$1,400 for a visit to Brazil to advise the Institute of Agronomy, Campinas, in soil science, and to the United States to consult with agricultural scientists

SWEDEN

Dr. Hans Borei, Wenner-Grens Institute, Stockholm; \$600 for visits within the United States to centers of zoological research from the University of Pennsylvania, where he was visiting professor in the Department of Zoology, February to June 1951

Professor Einar Hammarsten, Karolinska Institute, Stockholm; \$1,000 for visit to Italy to work in biochemical laboratories of the Superior Institute of Public Health, Rome

Karolinska Institute, Stockholm; \$1,000 toward expenses of symposium held at the Institute for Cell Research of the Karolinska Institute in September 1951, half for the expenses of delegates from the laboratory of Professor J. T. Randall, King's College, London

SWITZERLAND

Dr. Hans Burla, Zurich; \$500 for a trip to Brazil to take up assistantship in genetics to Professor A. G. Lagden Cavalcanti of the University of Brazil

URUGUAY

Dr. Eduardo De Robertis, Department of Ultrastructures, Institute of Biological Sciences, Montevideo; \$545 for trips in the United States to observe electron microscopy centers

UNITED STATES

Agricultural and Mechanical College of Texas, College Station; \$1,300 toward expenses of Dr. G. L. Artecona while doing advanced work in animal husbandry prior to going to the Institute of Agronomy of the North, Belém, Brazil

Dr. Harold F. Blum, National Cancer Institute, Bethesda, Maryland; \$1,200 for expenses of attending meetings and visits to various laboratories in Europe

California Institute of Technology, Pasadena; \$1,350 for expenses of Alberto Soriano of Argentina while working in experimental ecology in the Kerckhoff Laboratories of Biology

Professor George A. Edwards, Tufts College, Medford, Massachusetts; \$900 for travel to Brazil to work with Dr. Paulo Sawaya, professor of general and animal physiology at the University of São Paulo

Gordon Research Conferences of the American Association for the Advancement of Science, held at New Hampton, New Hampshire, in August 1951:

For expenses of European scientists invited to participate in the conference on physical methods in nucleic acid and protein research; \$4,000

For expenses of two European scientists invited to participate in the conference on general biochemistry; \$2,000

Dr. W. A. Hagan, dean, and Professor P. P. Levine, New York State Veterinary College, Cornell University; Professor I. D. Wilson, Virginia Polytechnic Institute; and Professor J. L. Lush, Iowa State College; \$4,100 for expenses of visiting South American centers of veterinary medicine and animal husbandry and of attending first Latin American Congress on Veterinary Medicine

Professor B. J. Luyet, Department of Biology, St. Louis University, Missouri; \$1,200 for expenses of attending International Symposium on Vitrification in England, June 1951

Dr. Harrison D. Stalker, Department of Zoology, Washington University, St. Louis, Missouri; \$600 for visit to laboratory of Dr. A. H. Sturtevant, Department of Biology, California Institute of Technology

University of Chicago, Illinois; \$1,000 for traveling expenses of Dr. Norbert Uri in coming from the University of Manchester to work in the university's Institute of Radiobiology and Biophysics

University of Minnesota, Department of Agriculture, Division of Plant Pathology, St. Paul; a \$600 allowance to provide continued training in plant pathology for Rosendo Postigo of Peru

Washington University, St. Louis, Missouri; \$3,300 for expenses of Dr. Tuneo Yamada, Biological Institute, Nagoya University, Japan, in coming to the United States to work in the Department of Zoology and to visit other laboratories engaged in experimental embryology

OTHER GRANTS

COLOMBIA

National University of Colombia:

Faculties of Agronomy, Medellín and Palmira; \$9,350 for farm machinery, tools and equipment needed in connection with the program of collaboration with Michigan State College promoted by the Technical Cooperation Administration of the United States Department of State

Institute of Natural Sciences, Bogotá; \$5,000 for acquisition of equipment, mainly herbarium cases, and bibliographic source materials

University of the Andes, Bogotá; \$5,000 for equipment and supplies for teaching, primarily in the laboratories of physics and chemistry

CUBA

La Salle College, Vedado-Havana; \$4,000 toward the cost of steel herbarium cases

MEXICO

Marine Secretariat; \$6,000 for services of a technical expert and a special consultant from the United States for cooperative development of a rural fish culture project

YUGOSLAVIA

Council of the Academies of Yugoslavia, Belgrade; \$7,500 for the purchase of scientific journals for the Universities of Belgrade, Zagreb, Ljubljana, Skoplje and Sarajevo

UNITED STATES

Columbia University, Department of General and Comparative Linguistics, New York; \$3,000 for the preparation and publication of a speech archive of different types of human communication in cooperation with an acoustical engineer

Fund totaling \$5,000 for grants of small amounts for equipment, materials, travel, honoraria and miscellaneous purposes, allotted under the supervision of the Director of the Division

DIVISION OF SOCIAL SCIENCES

DIVISION OF SOCIAL SCIENCES

STAFF DURING 1951

Director

JOSEPH H. WILLITS

Associate Director

LELAND C. DEVINNEY

Assistant Directors

ROGER F. EVANS

FREDERIC C. LANE ¹

PHILIP E. MOSELY ²

¹ Appointed Assistant Director July 1, 1951.

² Resignation effective June 30, 1951. Appointed Consultant beginning July 1, 1951.

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DIVISION OF SOCIAL SCIENCES

IN the President's Review section of this report on pages 58 to 76 will be found a discussion of the principles and programs of The Rockefeller Foundation in the field of the social sciences. The pages that follow give details on specific grants made in 1951.

SOCIAL SCIENCE RESEARCH COUNCIL

The Social Science Research Council was founded in 1923 for the purpose of advancing research in the social sciences. The council provides a much-needed system of efficient communication between government agencies, foundations and other groups, on the one hand, and the research specialists in the various disciplines at universities throughout the country, on the other hand. The staff and committees of the council perform important tasks in identifying scientific and practical problems which are ready for research and in helping to develop effective attacks on such problems. Such success as has been attained in this line has been achieved through winning the support and loyalty of those genuinely concerned with the development of objective, systematic and scientific methods for analyzing human and social problems.

The Rockefeller Foundation has contributed more than \$2,000,000 for support of the general administration and the conferences and planning program

of the council. The current annual rate of support for these continuing basic expenses is \$100,000. The Rockefeller Foundation in 1951 appropriated \$1,500,000 as a capital fund for the council. Two other grants, totaling \$270,000, provided final grants for general administration and for conferences and planning.

One of the significant services of the Social Science Research Council has been the administration of a program of modest grants in aid of research by individual scholars and scientists, chiefly in smaller institutions which are unable to provide funds for faculty research. A 1951 grant of \$75,000 continued for another three years Foundation support of this program.

SCIENTIFIC KNOWLEDGE OF SOCIAL BEHAVIOR

ECONOMICS AND ECONOMIC HISTORY

Present-day efforts to advance the understanding of economic behavior include many promising attempts at detailed study of actual economic operations and the analysis of empirical data derived from such study. The Foundation continues to support efforts in this line, as well as studies which will deepen and enrich the understanding of economic history.

HARVARD UNIVERSITY

Economic Research

The Rockefeller Foundation made a 1951 grant of \$140,000 to Harvard University to support a four-year program of economic research under Professor

Wassily Leontief. In the course of his work at Harvard, Professor Leontief has devised a new technique known as input-output analysis for studying the structure of an economic system.

The results of the research by Professor Leontief and his associates thus far are summarized in numerous articles and in two books by him: *The Structure of the American Economy* and a recent volume, *Studies in the Structure of the American Economy*.

Within the period of the new grant Professor Leontief plans to extend his research and apply it to new data. He will seek to improve methods for analyzing capital and capacity relationships and examine ways in which new techniques of production are introduced into the economy.

UNIVERSITY OF CAMBRIDGE

Social Accounts Study

With a grant of £191,500 which The Rockefeller Foundation made to the University of Cambridge in 1951, the university's Department of Applied Economics has undertaken a study of the social accounts of the County of Cambridgeshire, a region sufficiently wide to test procedures which could be applied on a national scale.

The purpose of the present study is to develop appropriate sampling methods for the collection of economic information necessary in constructing a system of social accounts, representing all monetary transactions among individuals and groups within a country's economy.

Mr. J. R. N. Stone, director of the Department of Applied Economics, is also the author of the current methods used in Great Britain to measure national income. It is expected that the proposed inquiry into the social accounts of Cambridgeshire will constitute an important check against those methods now used for measuring national income and its distribution. Mr. Stone and his staff believe, furthermore, that the results of the survey will be important not only for their methodological interest but also for their ultimate practical value to economists and other workers in a number of sociological fields. The grant from the Foundation gives support to the survey through December 1955.

UNIVERSITY OF MANCHESTER

Faculty of Economic and Social Studies

The Faculty of Economic and Social Studies at the University of Manchester, England, has been expanded to include, in addition to the well-established Economics Research Section, a new Department of Government and Administration. Professor Ely Devons, successor to Professor John Jewkes as dean of the Faculty of Economics and Social Studies, directs the research program, to which The Rockefeller Foundation has appropriated funds since 1933. In 1951 the Foundation made a grant of £7,500 for research activities during the next two years.

The Economics Research Section plans to undertake during the next few years studies in the following areas: the administration and accounts of nationalized industries; labor's adaptation to the modern

world; wage and salary structure; industrial development and the factors which foster or impede it; the economic development of unindustrialized countries; changes in Great Britain's economic development during the period 1870-1900; agricultural-economic studies of the northwest section of England; and local government finance.

Research by the Department of Government and Administration is to include studies on local and regional government; public corporations; the administration of social services from the client's point of view; and comparison studies of local government in Great Britain with counterparts in other countries.

HARVARD UNIVERSITY

Research Center in Entrepreneurial History

Funds provided by The Rockefeller Foundation since 1948 have helped to organize the Research Center in Entrepreneurial History at Harvard University. Under the direction of Professor Arthur H. Cole, the center has undertaken to study the role of the business entrepreneur as an agent of social change and to investigate the historical relationship of men and time to economic theory.

Several students have now been trained by Professor Cole, and scholars outside Harvard University have been stimulated to join the activities of the center. The earliest work there resulted in a volume entitled *Change and the Entrepreneur*. A second book, *Men in Business*, consists of 12 studies in the history of entrepreneurship, among them: *The American Industrial Elite in the 1870's: Their Social Origins*; *The*

Business Elite in Business Bureaucracies; Life Insurance in the Nineteenth Century: A Conflict of Two Systems; Frank Julian Sprague: Father of Electric Traction (1857-1934); Henry Varnum Poor: Philosopher of Management; and John Stevens, General Entrepreneur (1749-1838).

A journal of informal discussion entitled *Explorations in Entrepreneurial History* is regularly published by the Research Center and is widely distributed to scholars and to libraries in this country and abroad.

In 1951 The Rockefeller Foundation made a grant of \$10,000 to the Research Center for a revision of *Change and the Entrepreneur* to embody the center's current thinking on the nature of entrepreneurial history.

In addition, a special fund of \$10,000 was set aside by The Rockefeller Foundation officers to contribute to the expenses of economic historians visiting the Research Center. Drawing from this fund, two grants have already been made: \$3,000 to Wellesley College for Professor Leland M. Jenks to continue his work at the center, and \$2,060 to the University of Chicago to enable Professor Sylvia Thrupp to spend six months at the center working on a study of the market as it operates in agrarian and industrial societies.

NATIONAL INSTITUTE OF ECONOMIC AND SOCIAL
RESEARCH, GREAT BRITAIN

The National Institute of Economic and Social Research in Great Britain was established in 1938 to pursue an independent research program and at the same time to provide a nucleus for the coordination

and promotion of studies in British universities and independent research bodies. The Rockefeller Foundation has made a series of appropriations to the National Institute and in 1951 made an outright grant of £13,750 for its general purposes.

Sir Henry Clay for many years directed the institute as president of the council and as a member of the executive committee, which also includes economists drawn from the fields of education, finance and government. He has recently retired, and Mr. W. A. B. Hopkin will become director on October 1, 1952.

THE JOHNS HOPKINS UNIVERSITY

Department of Political Economy

The Rockefeller Foundation has made a grant of \$37,500 to the Johns Hopkins University for salaries and travel expenses of three professors from Europe who are to join the Department of Political Economy, one each year during the three-year period beginning September 1, 1951.

The European professors, through sharing their experience and new points of view, will, it is hoped, strengthen the department as a center for advanced graduate work. The visiting professors will join the ten members of the department at present concerned, through research or theory, with problems of labor supply and demand, fiscal policy, international trade, Russian economic issues and mathematical economics.

POLITICAL BEHAVIOR

Studies of political behavior aided by the Foundation include work at Harvard University on state

election statistics. This and a study at Bennington College on political interest groups seek to determine the influence of organized groups on public policy.

HARVARD UNIVERSITY

State Election Statistics

Research in the field of political behavior would be facilitated by data on state elections assembled in a readily usable form. A study in this field has been undertaken by Professor V. O. Key with the aid of a three-year grant of \$47,500 from The Rockefeller Foundation. Professor Key is on the faculty of the Harvard Graduate School of Public Administration and is the author of *Southern Politics*. His present research involves the collection and analysis of state election returns from 1910 to 1950 in the states east of the tier from North Dakota to Missouri and north of the Mason-Dixon line.

Assembled material will increase current knowledge on such phases of the state electoral process as the relationship between the direct primary election and party irresponsibility; open and closed primaries and party irresponsibility; the sensitivity of state legislatures to shifts in party divisions in the electorate; the general nature of the state party systems; variations in electoral participation; voting behavior in relation to changing environmental conditions; the efficacy of the party machine; and the interrelation of state and national politics.

A by-product of the current study is the elementary handbook on statistical methods in political research

which is being prepared by members of Professor Key's seminar on political behavior.

BENNINGTON COLLEGE

Interaction in the Political Process

Closely related to Professor Key's research is another study representing an empirical approach to problems of political behavior. Dr. Oliver Garceau, professor of government at Bennington College, Vermont, is working on organized interest-group interaction in the political process. The Rockefeller Foundation has made a three-year grant of \$27,100 to Bennington College for the study, which will have its headquarters at the Harvard Graduate School of Public Administration, where Professor Garceau is serving as consultant at the Littauer School.

For purposes of this study, "interest group" is defined as a formally organized association having a significant concern with major public policies but not primarily interested in capturing elective offices. Professor Garceau and his assistants are observing economic, civic and professional organizations on the local, state and federal levels to determine how interest groups work together in selected arenas of political negotiation; circumstances which change these relations; the effect of group alignments and their influence on major policy issues; and the strategy of interest-group politics in the context of party politics.

A preliminary survey is being made to identify the political issues which attract the interest of organized groups. Observers will interview members and group leaders and will analyze sessions of state legislatures.

Preliminary work has already been done on the level of state politics in Vermont. Data will be collected on urban and metropolitan areas. At a later stage the techniques and concepts defined in these situations will be applied to the study of interest-group interaction in the federal government.

INTERPERSONAL AND INTERGROUP BEHAVIOR

During recent years the Foundation has been actively seeking to reinforce efforts to extend rigorous scientific methods to the study of interpersonal and intergroup behavior. The present efforts include studies of the process of communication and communicated values, child personality development and surveys of cultural values.

YALE UNIVERSITY

Communication and Attitude Change

Systematic studies of communications and of their influence on the formation of attitudes are increasing the general knowledge of how and why individual citizens develop their fundamental beliefs and purposes. One such study has been going on at Yale University since 1948 under the direction of Professor Carl I. Hovland. It is an experimental research program seeking to measure the effect which communications have on attitude change. When the study began, The Rockefeller Foundation made a grant of \$68,400 to Yale, and it has now renewed support for the project with a 1951 three-year grant of \$147,900.

In the first stage of the study on communications and attitude change, Yale investigators focused their

attention on the following major aspects of the problem: motivation in relation to change in attitude; group affiliation; intervening psychological processes; preparatory communication for future attitude formation; retention of attitude changes produced by communication; and personality factors in relation to individual reactions to the same communication.

Encouraged by the results of the findings thus far, Professor Hovland and his associates are continuing the inquiry to determine particularly the extent to which an attitude changes because of motivation, social influences and past experiences. Present plans also call for the expansion of the program to include areas of language, symbolism, and measurement methodology.

The training aspects of the program continue to allow research fellows and graduate assistants to participate in each phase of the research, from original planning to final write-up. In addition, two cooperative phases have now been added to the Yale program on communication and attitude. The first is a summer seminar bringing together the Yale investigators and outside people working in this same field. The second is occasional collaborative studies with individuals not a regular part of the Yale group, a measure designed to increase the quality of talent available for the project and to stimulate research in other places.

RUTGERS UNIVERSITY

Studies in Communication

From data compiled in communication studies at Rutgers University, there appears to be a considerable

difference in the response of those children who converse primarily with their fellow students and those, on the other hand, who communicate chiefly with adults. Professor John W. Riley, Jr., chairman of the Department of Sociology, directed the two pilot studies — the first among 50 students in a New York progressive school, the second among 400 children in a New Jersey public school.

Professor Riley and his associates have now started a communications research project to explore more rigorously the differences in response and the influence of the group on the child's reception of communicated values. This current phase of the communications study has been given the support of The Rockefeller Foundation with a 1951 grant of \$14,000.

In the new survey 800 high school pupils who represent two or three comparatively homogeneous communities are individually interviewed and given self-administering questionnaires. After classifying the pupils as to whether they are primarily influenced by their parents or their fellow students, the Rutgers group will study the responses to material selected from the mass media of communication — radio, television, comics, for instance — hoping thereby to discover what differences in reactions are associated with differences in group orientation.

The immediate purpose of this study is to contribute to the knowledge of how children derive their values and opinions. As in the case of the Yale study previously described, this project aims at a more basic understanding of the role of social groups in the transmission of values.

HARVARD UNIVERSITY

Laboratory of Human Development

Steady progress is being made at Harvard University's Laboratory of Human Development toward understanding the role of social and cultural factors in the development of a child's personality. The laboratory study is under the direction of Professor Robert R. Sears of the Faculty of Education.

Professor Sears started his work on social and cultural factors in child development while at the University of Iowa, on the staff of the Child Welfare Research Station. The Rockefeller Foundation made a grant in 1947 to support this work at Iowa and another in 1950 following the transfer of the project to Harvard. The Foundation now has continued support with a grant of \$64,500 to Harvard University for the three-year period beginning September 1, 1952.

During the two years spent on the project at Iowa, data were collected and methods developed for a pilot study on the development of aggression and dependency in young children; these data were analyzed during the third year of the study. A second pilot study has measurably strengthened the hypotheses on the origins of aggression and identification of children with their parents.

The Harvard group, which has now developed into an active research center for graduate students in social relations, psychology and education, is undertaking, with the aid of Foundation funds, to continue its series of pilot studies and work on methodological development. Professor Sears and his associates plan

to investigate problems relating to the differential identification of girls and boys and the factors that produce the differences; problems concerning the revolt against identification during preadolescent years, following the age of five; and problems relating to the role of identification in creating guilt on the one hand and positive values on the other, and the relations of both of these to the development of conscience and the internalization of social norms during the preschool period.

HARVARD UNIVERSITY

Laboratory of Social Relations

Using as its field laboratory a small region in the southwestern United States, Harvard University's Laboratory of Social Relations in 1949 began a study of comparative culture values. Here within a small area the research team is able to compare five different culture groups — Mormons, Texans, Navahoes, Zuñis and Spanish Americans.

By observing and comparing cultures of groups limited in size and complexity, the Laboratory of Social Relations hopes to develop objective methods for more extensive investigations of personal and group values. The work also provides an opportunity to test new methods and to promote interdisciplinary research in the field and classroom seminar.

The information to be gained in this study has interested a variety of social scientists — anthropologists, sociologists, social and clinical psychologists, political scientists and historians. Many representatives of these disciplines, some of them from other

institutions, have cooperated in the field work of this study.

The intensive field work in the study area was completed in 1951. During 1952-1953 the Harvard team proposes to analyze the data and work on preliminary reports. In 1953-1954 there will be more field work and testing of the refined theories. The next year will be devoted to the analysis of data and the writing of the final report. In the meantime the more significant findings are appearing in articles and monographs.

Professors John M. Roberts and Evon Z. Vogt have directed and coordinated the study with the aid of an advisory committee consisting of Professor Talcott Parsons, chairman of the Department of Social Relations, Professor John O. Brew, director of the Peabody Museum of Archaeology and Ethnology, Professor Clyde Kluckhohn of the Harvard Department of Anthropology, and an executive committee from the laboratory.

The Rockefeller Foundation first contributed to this study with a grant of \$100,000 in 1949; another grant of \$100,000 was made in 1951 for the cultural values study during the years 1952 to 1955.

RESEARCH TOOLS AND METHODS

The dependence of improvements in empirical social science research on the continuing development of ever better research tools is widely recognized. Advances in the science of statistics and in its application to social research comprise one of the most important lines of such development.

UNIVERSITY OF CHICAGO

Applied Statistics

On joint recommendation by the Division of Social Sciences and the Division of Natural Sciences and Agriculture, The Rockefeller Foundation in 1951 made a grant of \$75,000 to the University of Chicago for a program of advanced training in applied statistics. An account of this grant appears in the section on Natural Sciences and Agriculture, pages 302 and 305.

NATIONAL OPINION RESEARCH CENTER

Studies of Interviewing

The National Opinion Research Center in Chicago is conducting a study on problems which challenge interviewers conducting public opinion polls. The study, designed to improve current interviewing methods, was developed by a joint committee (of the Social Science Research Council and the National Research Council) on the measurement of opinions, attitudes and consumer wants. It resulted from the recognition that while bias may enter at any stage in the survey, errors arising during the interview are crucial, for it is in the interview that data are elicited and recorded.

The primary objectives of the study at the National Opinion Research Center have been to isolate the variables introduced by interviewers and to determine the extent to which these factors influence both the person being interviewed and the interviewer himself. A further objective of the program is to control these

variables through the selection, training and supervision of the interviewers and the preparation of improved questionnaires.

Dr. Clyde Hart, director of the center, is in charge of the study, for which The Rockefeller Foundation in 1951 made a grant of \$12,885. An earlier appropriation for this study was made in 1947.

APPLICATIONS TO SOCIAL PROBLEMS

INTERNATIONAL RELATIONS AND UNDERSTANDING

For many years a major interest of the Division of Social Sciences has been to help bring scholarship and broad-gauge thinking to bear on the far-reaching problems of international relations. Several grants reflect a continuation of this interest.

PRINCETON UNIVERSITY

Institute of International Studies

The Rockefeller Foundation has made a five-year grant of \$200,000 to Princeton University for the Institute of International Studies. The institute, until 1951 a part of Yale University, since 1935 has had support from the Foundation totaling \$402,600. Dr. Frederick S. Dunn, director of the institute at Yale, continues as director at Princeton.

In continuing research on foreign policy and international affairs, members of the institute have contact with a wide variety of interdisciplinary social science groups at Princeton. These include the recently organized Center for Research in World Political Institutions, the Office of Population Research, the

International Finance Section and the Office of Public Opinion Research.

The staff of the institute is continuing to publish the quarterly journal, *World Politics*, as well as the monograph series and research memoranda on international relations. Dr. Dunn and members of his staff are regular consultants to the Department of State and frequently undertake special research assignments for the government.

COUNCIL ON FOREIGN RELATIONS, INC.

In 1951 The Rockefeller Foundation made three grants amounting to \$86,000 to the Council on Foreign Relations, Inc., New York. The first grant of \$45,000 went to the council for the group studies which are a part of the general research program. The council has enlisted prominent scholars and men in public life to take part in group studies on foreign policy issues of immediate importance.

The issues and the men who head the study groups are: 1) Aid to Europe: General Dwight D. Eisenhower, chairman, and Professor Lindsay Rogers of Columbia University, director of research; 2) Japanese Peace Treaty: President Everett Case of Colgate University, chairman, and Professor Hugh Borton of Columbia University, director; 3) United States Policy in the United Nations: the Honorable Benjamin V. Cohen, formerly counsellor of the Department of State, and Joseph E. Johnson, president of the Carnegie Endowment for International Peace, joint chairmen, and Leland M. Goodrich of Columbia University, director of research; 4) Power of Soviet



Photograph Excised Here



A member of the demographic survey staff of the Gokhale Institute of Politics and Economics, Poona, interviews an Indian family

Photograph Excised Here

Union: Professor Philip E. Mosely of Columbia University, director; and 5) Problems of Strengthening Democratic Leadership Abroad: Whitney H. Shephardson, director of the British Dominions Fund of the Carnegie Corporation, chairman.

A sixth study group is assigned to investigate political implications of economic development programs. For this project The Rockefeller Foundation made a separate two-year grant of \$25,000. Many studies have been made on the economic consequences of programs for investment in underdeveloped areas, but the political implications of such programs have been insufficiently explored. Inevitably large-scale industrial development brings a change in political and social structures of the countries involved. Will these changes follow the pattern set in the nineteenth century when political democracy in both the United States and Great Britain followed industrialization? Or will the countries now being industrialized head in some other direction? These and other possibilities are being explored in the investigation of economic aid and what it means to the national and international politics of the countries involved.

Dr. Stacy May of the International Basic Economy Corporation, New York, is chairman of this study group. The project director is Dr. Eugene Staley, senior economist at the Stanford Research Institute. At the termination of the study, Dr. Staley will incorporate the findings and the recommendations of the study group members into a book.

A third grant of \$16,000 was made to the Council on Foreign Relations, Inc., for the study of British-American relations which the council has undertaken

jointly with the Royal Institute of International Affairs in London. Members of both research organizations are studying British and American points of view on major foreign policy issues. They hope to explore the possible grounds for compromise on such issues as settlement in Korea, the future of Formosa, a policy toward Communist China, the future of Japan and Germany, closer association of the countries of Western Europe and a policy with respect to the atom bomb.

Members of the British and American groups are preparing to exchange critiques of the policy of each other's country, and later there will be a meeting to supplement written reports with a personal exchange of ideas. The chairman of the British group is Admiral Sir Henry Moore; Dr. Henry Wriston is chairman of the American group.

HAVERFORD COLLEGE

Case Studies of Technical Assistance

Deposited at Haverford College, Pennsylvania, are the records of the American Friends Service Committee containing the experiences of that private organization in handling small technical-assistance programs in various parts of the world. Haverford College is to use these records, as well as its personal connections with the committee, in the development of a graduate program to train personnel for social and technical assistance in underdeveloped areas.

One of the required courses in the new program, which began in September 1951, is a case study of previous assistance projects. The course is to consider

the spirit and objectives of various types of programs, their organizational structure and actual operating techniques. In this study, due regard is to be given to the geographical and cultural background of the areas concerned.

Much of the material on actual cases must first be collected in a readily usable form. Haverford College is appointing research personnel to do this work and to compile a casebook of the most revealing experience available in the United States.

The Rockefeller Foundation made a 1951 grant of \$20,550 to Haverford College for the salaries of research personnel working on this handbook and for the expenses connected with its preparation and eventual publication. It is expected that the case materials collected should be valuable not only for this course but for agencies and practitioners in the field of aid to underdeveloped areas.

ROYAL INSTITUTE OF INTERNATIONAL AFFAIRS, LONDON

The research program pursued by the Royal Institute of International Affairs since 1945 has emphasized studies on the Soviet Union, Eastern and Western Europe, the Middle and Far East, Southeast Asia, Latin America and on international organization. During the next five-year period work is to continue in all of these fields, as well as in contemporary history, international law, philosophy and politics, international economics and British Commonwealth relations. The Rockefeller Foundation, which has made grants to support the institute since 1932, now has renewed support with a three-year grant of

£15,000 for the institute's research on underdeveloped territories, the Middle East and the Soviet Union.

Problems of underdeveloped territories underlie many of the regional studies made by the institute, particularly in the Middle East, tropical Africa and Southeast Asia. In all such projects the cooperation of Western scholars and local specialists is secured. Present plans call for a series of collaborative studies on the relation of economic standards in different regions or countries to the proportions in which labor, capital, land and other resources contribute to their productive activity. Other surveys planned on underdeveloped areas include the relationship of Western private enterprise to the governments of countries requiring development; also, the effects of the economic progress of underdeveloped countries on advanced countries.

The institute's series on the Middle East will continue the economic, social and regional studies started in 1946. Plans include research on the attitude of the younger generation, particularly those members with Western education, toward the economic development of Middle Eastern countries. A political and economic survey of North Africa is also scheduled, the findings to be incorporated into a book which will be a companion piece to the 1950 volume *The Middle East: A Political and Economic Survey*.

Since 1941, the institute's program on the Soviet Union has been designed to explain the Soviet policies both to the scholar and to the general reader. In continuation of this program the following studies are

planned for the immediate future: Documents on the Comintern, 1919-1943; an Historical Analysis of the Principles Underlying Soviet Foreign Policy; Soviet Labor Policy; Soviet-Turkish Relations; Communist Agrarian Policy in Underdeveloped Countries; Soviet-German Relations, 1922-1934; and Anglo-Soviet Commercial Relations.

UNIVERSITY OF FLORIDA

Land Tenure in the Middle East

The success of economic development programs in important areas of the world rests in part on the ability to resolve problems of land tenure and land use. In the Middle East, for instance, it is not always known who actually owns large tracts of land. In some cases it is not clear whether a given tract belongs to the state, to an absentee landlord or to the resident cultivator. In other cases, the traditional grazing rights of tribal groups are confused with the rights of ownership and cultivation. While communal ownership worked well enough when the tribal nomads were engaged in sedentary agriculture, under present conditions the system is not satisfactory. It is neither completely cooperative nor wholly private and consequently acts as a brake upon both group and individual initiative.

Professor Raymond E. Crist, who was at the University of Maryland from 1947 to 1951, has made field studies of the existing land tenure systems in parts of Latin America, the Caribbean area and the Mediterranean countries. The Rockefeller Foundation in 1951 made a grant of \$11,450 to the University

of Florida, where Professor Crist is now on the faculty of the Department of Geography, for a study of land tenure and land utilization in the Middle East. From headquarters at the American University of Beirut, Professor Crist is studying the situation in Lebanon, Syria, Jordan and, if time permits, Palestine, Iraq and Saudi-Arabia.

INTERNATIONAL AFRICAN INSTITUTE, LONDON

Studies in West Africa

The Rockefeller Foundation has given £3,000 to the International African Institute, London, toward the costs of field studies, by British and French investigators, of the Fulani-speaking peoples of West Africa.

The International African Institute, formerly called the International Institute of African Languages and Cultures, was established in 1926 by representatives of universities, scientific and missionary societies, and by the governments of Great Britain, the Union of South Africa, Egypt, France, Belgium, Italy, Germany, Austria, Sweden and the United States. Their purpose was to create an international center where organizations interested in African society and economics could effectively coordinate their activities and cooperate in research projects related to African problems.

The institute's chief interest has been in African anthropological, sociological and linguistic studies, and in the application of the acquired knowledge to a solution of problems caused by the impact of European civilization on primitive African cultures. A

further continuing aim is to bring about closer association between scientific knowledge and research, on the one hand, and the practical interests of the administrator, educator, missionary and colonist, on the other, in an attempt to make an increasingly effective contribution to the solution of the human problems of the African continent.

The institute proposes to make an intensive study of the Fulani-speaking peoples in West Africa, particularly in Nigeria and French Niger. The Foundation grant will cover the salary of a field research worker, the costs of his field equipment and his travel expenses between London and Africa, over a four-year period. The Colonial Social Sciences Research Council of the British Colonial Office, the Nigerian government and the French colonial authorities are providing for the other field workers, for transportation and for housing required on the project.

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE Long-run Tendencies in the European Economy

In connection with its over-all program on postwar recovery, the United Nations Economic Commission for Europe (ECE) in 1949 asked Professor Ingvar Svennilson, the Swedish economist, to undertake a study of long-run trends in the European economy. Professor Svennilson and a staff of assistants at Geneva are now nearing the end of this work. It is essentially a survey of trends in the European economy for the years 1913-1950, with emphasis on population, industrialization, manpower and production, the influence of foreign trade on production and the

important factors contributing to economic growth in Europe.

The Rockefeller Foundation appropriated \$50,000 to the Economic Commission for Europe when Professor Svernison began this work in 1949; in 1951 the Foundation made a one-year grant of \$23,725 for expenses in connection with the completion of the survey. The United Nations intends to publish the findings.

STANFORD UNIVERSITY

Food Research Institute

The resources of Stanford University's Food Research Institute are devoted entirely to the study of the economics, sociology and politics of food.

The Rockefeller Foundation has made grants to the Food Research Institute since 1940. The largest appropriation was a grant of \$300,000 made in 1946 for an historical survey of food and agriculture in World War II. In 1951 a four-year grant of \$70,000 was made to continue support for this study. Parts of the grant are also being used for the institute's research on Soviet economy and for a new study of consumption levels in nine of the world's sugar-producing islands.

Within the period of the present grant, the staff of the Food Research Institute aims to complete a history, comprising 22 projects, related to problems of balancing food requirements for the armed forces and the civilian population during the years 1939-1945. Twelve projects deal with national and regional war-time food problems, three with international organizations and international cooperative arrangements.

The remaining seven projects describe the history of specific food commodities.

The principal publication resulting from the institute's research on the Soviet economy is Dr. Naum Jasny's study entitled *Socialized Agriculture of the U.S.S.R.* Dr. Jasny, collaborating with Dr. Slave Zagoroff and Dr. Vladimir Timoshenko, is preparing *Essays on the Soviet Economy* and *The Impact of World War II on Soviet Food and Agriculture*.

The Food Research Institute is undertaking comparative research on recent historical changes in consumption levels and the levels of living. For this study the investigators have chosen nine sugar-producing islands with areas small enough to permit studies of the over-all economy. The islands tentatively selected are Puerto Rico, Jamaica, Guadeloupe, the Hawaiian Islands, the Cape Verde Islands, Mauritius, Reunion, the Fiji Islands and New Caledonia. These have comparatively similar natural conditions but are widely diverse from the standpoint of cultures, race characteristics, economics and politics. An investigation is expected to reveal the stimuli or barriers to change on islands which rely for their survival, in varying degrees, on the export of sugar. The initial period of study and research at the Food Research Institute will be followed by visits to the islands. An historian and a sociologist or cultural anthropologist are joining economists in this study.

SOCIAL SCIENCE RESEARCH COUNCIL

Current Digest of the Soviet Press

Since 1949 *The Current Digest of the Soviet Press* has provided a coverage of current Soviet materials to

United States government agencies, other governments, United Nations departments, universities, libraries, public and private organizations and individual scholars. The *Digest* is published weekly in New York under the supervision of a subcommittee of the Joint Committee on Slavic Studies, which is appointed jointly by the American Council of Learned Societies and the Social Science Research Council.

The Current Digest of the Soviet Press contains translations of complete texts, condensed texts, summaries and index listings covering over 40 Soviet newspapers and other periodicals. A fuller description of this work is given in The Rockefeller Foundation Annual Report for 1950. Toward support of *The Current Digest of the Soviet Press* \$50,000 was appropriated by The Rockefeller Foundation in 1951, the project being sponsored by both the Division of Social Sciences and the Division of Humanities.

LIBRARY OF CONGRESS

Accessions Lists

Another grant sponsored jointly by the Divisions of Social Sciences and Humanities provided \$8,700 to the Library of Congress toward the cost of preparing and publishing a list of its East European accessions and expanding the current list of Russian accessions. A fuller account of this grant appears in the report on the Division of Humanities, pages 402 to 403.

TOKYO UNIVERSITY AND STANFORD UNIVERSITY

American Studies

A grant of \$160,000 was made on the joint recommendation of the Division of Social Sciences and the

Division of Humanities for expenses connected with five summer seminars on American studies in Japan. The program is sponsored by Tokyo University and Stanford University. A full account of this appropriation appears in the report on the Division of Humanities, pages 398 and 401.

PUBLIC ADMINISTRATION CLEARING HOUSE

Consultant for Japan

Throughout the period of Allied occupation of Japan there has been an effort to shift the emphasis of the Japanese governmental organization from a highly centralized bureaucratic control system to a more widely diffused pattern, with large areas of self-determination in local matters delegated to prefectures, cities, towns and villages.

One group in Japan which is sponsoring the spread of this movement is the recently organized Japan Public Administration Clearing House. All three levels of local government are represented in this group, which is made up of delegates from the Tokyo Bureau of Municipal Research and the national associations of prefectural governors, prefectural assembly chairmen, municipal mayors, city assembly chairmen, town and village mayors and town and village assembly chairmen.

Assistance was offered to the new organization by the Public Administration Clearing House of Chicago. With a grant of \$10,740 from The Rockefeller Foundation, the Chicago Public Administration Clearing House arranged to send a consultant to Japan and to make its official resources available to the group in Japan.

Dr. George A. Warp, on leave of absence from his teaching duties at the University of Minnesota, is now in Japan to counsel the group on the development of an administrative service and to share his knowledge of that Western experience which would be suited to Japanese needs and conditions. Dr. Warp is working with a selected group of young Japanese men who, when sufficiently trained, will carry on the work of the Public Administration Clearing House in their own country.

GOKHALE INSTITUTE OF POLITICS AND
ECONOMICS, INDIA

The Rockefeller Foundation has made a five-year grant of 105,000 Indian rupees to the Gokhale Institute of Politics and Economics, Poona, India, for the organization of a section devoted to Indian demography. The Foundation grant supports a series of investigations on fertility, morbidity and mortality in rural and urban centers of India. Relevant social and economic data will supplement the demographic statistics collected in interviews with representatives of different caste, occupational and income groups.

The Gokhale Institute of Politics and Economics was started in 1930 under the sponsorship of the Servants of India Society, a nonsectarian, nonpartisan organization whose activities are comparable to those of the American Society of Friends. Dr. D. R. Gadgil, who has been director of the institute since it started, has developed a program of research on practical problems of urban and rural life. Up to the present time 21 major studies have been prepared by the

staff, which includes seven full-time members as well as part-time field and clerical workers.

NATIONAL FOUNDATION OF POLITICAL SCIENCES, FRANCE

International Relations

The National Foundation of Political Sciences in Paris is a center for the promotion of research and teaching in the social sciences. In 1948 the National Foundation initiated a section on international relations, and since that date it has been building up a library to serve this section.

A grant made by The Rockefeller Foundation in 1950 enabled the National Foundation to acquire maps and other library materials in the United States. A 1951 grant of \$1,000 makes possible the continued purchase of foreign publications from dollar areas.

A STRONG AND VIGOROUS SOCIETY

An indispensable corollary of effective international relations is the maintenance of a strong and vigorous society at home. This has never been more true than in the present world struggle for the preservation and extension of free institutions. A number of the Foundation's grants in 1951 were intended to contribute to efforts dealing with social problems which may threaten the strength and vigor of our society.

AMERICAN LAW INSTITUTE

Model Criminal Code

A model criminal code with commentaries is now being prepared by the American Law Institute of

Philadelphia. A preliminary study of this subject was undertaken in 1950 with the aid of a grant of \$20,000 from The Rockefeller Foundation. The actual project is now under way with a 1951 grant of \$222,500 from the Foundation, to be available to the institute for the next five years.

The present long-term project of the American Law Institute evolved from the institute's concern that criminal law and procedure in the United States, despite its cardinal importance, has not had the adequate or specialized attention that has aided the development of private law and those aspects of public law which bear directly on the regulation of important economic interests.

The actual code will in time be a technical document designed to iron out the present inconsistencies, obsolete distinctions and confused language found in many penal statutes. The code and commentaries are intended to reflect a redefinition of the philosophy underlying criminal law and to contain proposals for improving and revising the present penal laws by making use of insights gained from the social, medical and psychiatric sciences.

The preparation of the code and commentaries is directed by a small policy committee composed of a psychiatrist, a criminologist, a sociologist and two lawyers. Ex-officio members of the policy committee are Harrison Tweed, president of the institute, and Judge Herbert F. Goodrich, director. The work on the technical side is headed by Professor Herbert Wechsler of the law faculty of Columbia University,

who has been named reporter for the institute's project.

AMERICAN BAR ASSOCIATION ENDOWMENT

Commission on Organized Crime

With a view toward strengthening the laws dealing with organized crime in this country, the American Bar Association's Commission on Organized Crime is now preparing a series of model statutes.

The Commission on Organized Crime came into being in September 1950 under the chairmanship of the late Judge Robert P. Patterson. The commission was authorized by the American Bar Association to cooperate with the Senate Committee to Investigate Crime in Interstate Commerce and to make independent studies of the existing criminal law and procedure, law enforcement and sentencing practices. The work of the commission was supported by a 1950 grant of \$25,000 from The Rockefeller Foundation. In 1951 the Foundation made another \$25,000 grant to the American Bar Association Endowment to finance the preparation by the commission of the following statutes, the need for which was clearly demonstrated by the disclosures of the Senate committee and the findings of the commission's own research reports:

- 1) a model gambling code
- 2) a model statute providing greater state control and supervision over local police departments
- 3) a model statute providing for greater supervision by the Governor and Attorney General of each state over their state's local prosecutors

- 4) a model crime commission act
- 5) a uniform perjury statute
- 6) a uniform immunity statute

The American Bar Association has authorized the commission to draft these statutes in cooperation with the special Committee on Uniform Acts to Prevent Organized Crime appointed by the National Conference of Commissioners on Uniform State Laws. The commission and the National Conference of Commissioners together are making use of all help to be obtained from law schools, from individual state and local officials, and from appropriate sections of the American Bar Association and the Council of State Governments. Judge Morris Ploscowe continues as executive director of the Commission on Organized Crime and is responsible for the supervision of the investigations.

UNIVERSITY OF CAMBRIDGE

History of English Criminal Law

A definitive history of English criminal law and its administration from 1750 is being written by Dr. Leon Radzinowicz, a member of the Department of Criminal Science at the Faculty of Law, the University of Cambridge, England. In this four-volume work the author intends to bring out the interrelationship of criminal law with the contemporary aspects of political and economic life. Volume one, *Movement for Reform*, was awarded the James Barr Ames prize and medal by the Harvard Law School in 1950.

Dr. Radzinowicz is now at work on the second volume, *The Maintenance of Public Order*. He plans

to complete the history with a volume on the *Penal System* and a final one on *Machinery of Justice*. A committee formed to advise Dr. Radzinowicz during the period of his research and writing has as its chairman Viscount Maugham, onetime Lord Chancellor of England, and Lord Wright, Lord Simonds, Sir Arnold McNair, Sir Percy Winfield, Professor H. A. Hollond and Mr. J. W. C. Turner.

The Rockefeller Foundation is contributing to the completion of the historical review by means of a five-year appropriation of £6,250 to the University of Cambridge.

DUKE UNIVERSITY

Income Study

Within the past 30 years there have been improvements in the methods of estimating national income and in developing techniques for analysis and interpretation. Similar studies on income estimates in industries and individual states, so far few in number, are now projected by economists. A study by the Department of Economics at Duke University, Durham, North Carolina, is measuring the characteristics, behavior, sources and economic consequences of differences in state per capita incomes. Under the direction of Professor Frank A. Hanna, the study aims at establishing and testing some of the more important relationships on which further analysis and utilization of income payments by the separate states will depend.

The Rockefeller Foundation has made a grant of \$45,000 to support the project for five years. The

Foundation previously made a grant to the University of Wisconsin for income and income tax studies which Professor Hanna directed there from 1939 to 1942.

In addition to the direct contribution which such a study will make, the project will provide intensive research training in the income field for the graduate students and junior faculty of the Department of Economics who are presently assisting Professor Hanna in his work.

UNIVERSITY OF DELAWARE

Income Tax Study

Knowledge of the distribution of income by size, which would provide a most reliable gauge as to what our economic system contributes to the welfare of the individuals and the families that comprise the nation, is far from adequate.

The requirement of the State of Delaware that all residents over 21 years of age must file income tax returns provides the only complete body of information available on the distribution of income by size for the years prior to 1939. While the population of Delaware accounts for only a small portion of the national make-up, it is hoped that analysis of these data may produce results relevant to the nation as a whole.

With the aid of funds which The Rockefeller Foundation previously gave to the University of Delaware, data have already been compiled for an analysis of the size of the distribution of income, based on individual tax returns in each of the years 1925 through 1936. In 1951 the Foundation made a grant

of \$35,000 for two more years of the study, which has been a joint project of the University of Delaware, the State Tax Department and the National Bureau of Economic Research.

The Conference on Research in Income and Wealth of the National Bureau of Economic Research has appointed an advisory committee to serve throughout the study. The members are Dr. Selma Goldsmith, Department of Commerce; Professor William Vickery, Columbia University; and Professor James Tobin, Yale University. Professor Simon Kuznets of the University of Pennsylvania, author of several volumes on national income, is in close touch with the research team to offer counsel and technical aid.

COLUMBIA UNIVERSITY

Institute for Urban Land Use and Housing Studies

When the Institute for Urban Land Use and Housing Studies was established at Columbia University in 1947, members of its administrative board were drawn from the faculties of the Schools of Business, Law, Engineering and Architecture, and the Departments of Economics, Sociology, Public Law and Government. The institute, under the direction of Dr. Ernest H. Fisher, has investigated the theoretical and practical problems of urban land use and has created a training program for graduate students in the techniques of investigation and analysis in this field.

Four special areas for coordinated study and long-range research are the dynamics of land use, particularly the functional relationship between land use and

the movement of people, goods and vehicles; urban real estate market behavior; social science research as applied to the problems of city planning and redevelopment; and specific studies of public and large-scale housing development.

The Rockefeller Foundation made a \$100,000 grant to the institute in 1948; in 1951 the Foundation continued its support of the program at Columbia with an appropriation of \$66,000 for another three years.

UNIVERSITY OF CHICAGO

Agricultural Economics

Professor T. W. Schultz and Professor D. Gale Johnson of the University of Chicago are undertaking a program of research on low productivity in agriculture and the consequent lowering of living levels. This research is planned in two phases. The first is an attempt to delineate the areas of low productivity, investigate factors associated with low productivity in each area and analyze the problems involved in raising the level of productivity. As the second phase of the study, the agricultural economists hope to test two propositions: low productivity in agriculture in a given area is due to a high ratio of labor to land and capital associated with an outmoded technology; low productivity has significant self-perpetuating effects if it has existed for as long as a generation.

Most of the data needed for testing these hypotheses are readily available through the Bureau of the Census, the Bureau of Agricultural Economics and other government and state experiment stations.

Some supplementary field work by the university staff will be required.

The Rockefeller Foundation has given \$16,000 to the University of Chicago for three years of this research on low productivity in agriculture. A 1948 grant of \$45,000 was given for the earlier phase of the work of Professors Schultz and Johnson on the effective use of agricultural resources.

UNIVERSITY OF MISSOURI

Rural Church Study

In the past 25 years there has been in rural America a constantly accelerating trend toward easier communication and population mobility, toward mechanization of agriculture and economic improvement, toward secularization and urbanization of farm people and rural life in general. In the face of these changes many rural churches have been abandoned, and the church appears to be losing ground relatively, if not absolutely, in the rural areas. With the aid of a four-year grant of \$51,425 from The Rockefeller Foundation, the University of Missouri is now studying the role of the rural church in Missouri as a social institution.

Missouri provides a good laboratory for the projected study, as the state is a meeting-ground of several segments with distinct regional characteristics. The research group in the university's Department of Rural Sociology, in cooperation with the interdenominational Bible College of Missouri, is attempting to determine the present characteristics of the church as it exists and functions in rural society; the relation of

these characteristics to geographic, economic and cultural factors; the recent changes in the institution; and the outlook for the rural church as an institution and as a social force in rural life.

The study is under the general supervision of Professor Charles E. Lively, chairman of the university's Department of Rural Sociology.

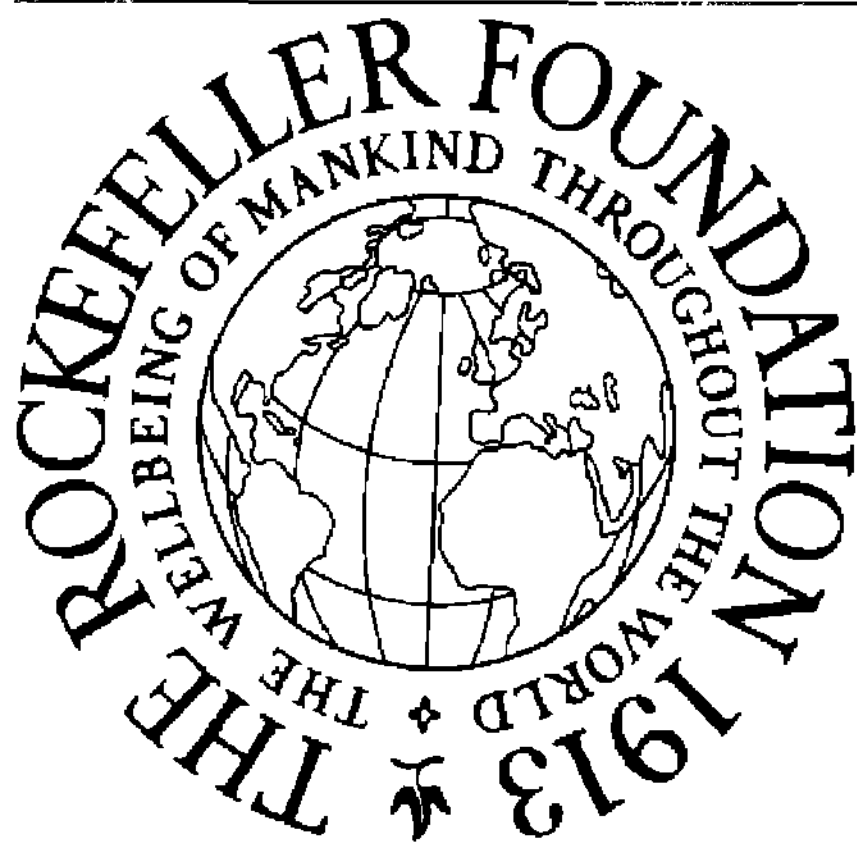
MAYOR'S ADVISORY COMMITTEE FOR THE AGED, NEW YORK CITY

There are in New York City almost 1,000,000 persons 60 years of age and over, approximately one-eighth of the city's total population. In order that New York City might intelligently approach the problems facing this ever-increasing group, the Mayor in 1949 appointed a group of New York citizens and officials to the Mayor's Advisory Committee for the Aged.

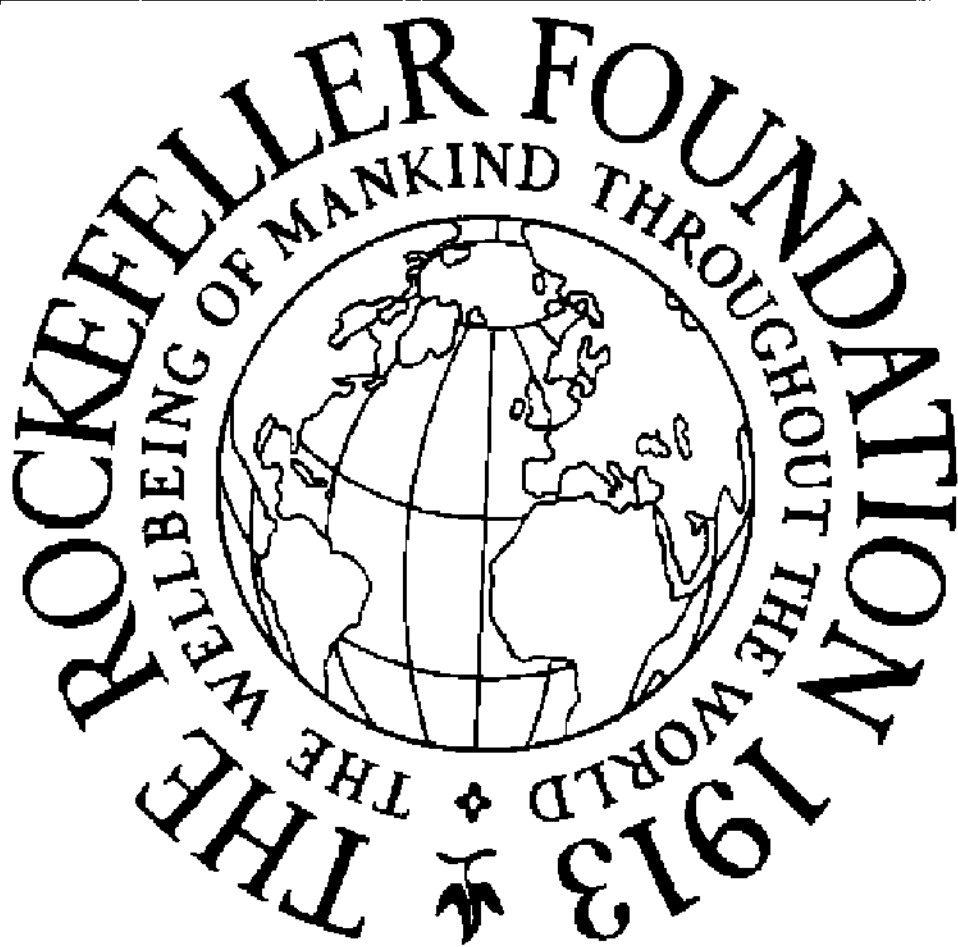
Mr. Raymond Hilliard, Commissioner of Welfare for the City of New York, is chairman of the committee. The immediate objectives of the group are to study housing and living conditions for the "senior citizens" and to encourage the development of research for preventing chronic illness and the provision of more clinic services for diseases which affect the aged. The committee also seeks ways to encourage the employment of the aged beyond the normally accepted retirement age, to expand the recreation facilities now available in the city and to broaden the present opportunities for adult education.

The Rockefeller Foundation has given \$25,000 to the Mayor's Advisory Committee for the Aged for

Recreation activity sponsored by the Mayor's Advisory Committee for the Aged, New York City



Photograph Excised Here



Photograph Excised Here

Recipients of training scholarships at the Institut de Science Économique Appliquée, Paris

Investigations of the Fulani-speaking people in West Africa are carried on by the International African Institute; below, a Fulani camp in the rainy season



Photograph Excised Here

an 18-month study of the human adjustment problems of the aged, specifically as these are presented in New York. The research has the close collaboration of Dr. Louis I. Dublin, vice-president of the Metropolitan Life Insurance Company and a member of the Mayor's Committee.

CORNELL UNIVERSITY

Civil Rights Study

The Rockefeller Foundation has made a grant of \$6,000 to Cornell University to complete a study of the relation of civil rights to the control of subversive activities in the United States. Professor Robert E. Cushman is director of research for the Cornell study, which the Foundation has supported with previous grants made in 1948 and 1950.

Seven publications resulting from this study have been completed or are nearing completion. These are *Security, Loyalty, and Science* by Walter Gellhorn of the Columbia University Law School; *The Tenney Committee* (of California) by Edward L. Barrett, Jr., University of California Law School; *Legislative Control of Subversive Activities in New York* by Lawrence H. Chamberlain, dean of Columbia College; *Un-American Activities in the State of Washington* by Vern Countryman, Yale Law School; *The States and Subversion* edited by Mr. Gellhorn; *The House Committee on Un-American Activities* by Robert K. Carr, Dartmouth College; and *The President's Loyalty Program* by Eleanor Bontecou.

Professor Cushman, in completing the project, is preparing a concluding volume on the experience

which this country has had in reconciling the necessary demands for security with the traditional American standards of liberty.

HARVARD UNIVERSITY

Foreign Labor Movements

The Rockefeller Foundation in 1951 made two grants totaling \$15,000 to Harvard University toward the completion of studies on the economic and political influence of labor movements and collective bargaining in six European countries.

The Harvard series began in 1949 with the aid of funds from the United States Army Operations Office and the Department of State. Professor Sumner H. Slichter and Professor John Dunlop of the Harvard Department of Economics are supervising the studies assigned to individuals especially familiar with the background of the labor union activities in the selected countries. Professor Walter Galenson, assistant professor of economics, Harvard University, and formerly labor attaché in Oslo, is studying Denmark and Norway; Mr. Daniel Horowitz, on leave from service as labor attaché with the Department of State, Italy; Mr. Val Lorwin, formerly with the Department of State, France; Professor Carl E. Knoellinger, Åbo Akademi, Finland; and Professor Clark Kerr, director of the Institute of Industrial Relations, University of California, Western Germany.

In each case the studies cover the relations of unions to management, characteristics of union government, and relations between unions and between

unions and political parties. The day-to-day operation of labor movements in the economic and political areas is under study, with special attention given to the process of decision making, to policy considerations and to ideologies. The 1951 grants from The Rockefeller Foundation are being used for the costs of travel and secretarial assistance required to complete the studies.

UNIVERSITY OF ALBERTA

Local Government Problems

The Department of Political Economy at the University of Alberta, Canada, has undertaken research on local government problems with Dominion-wide implications. The Rockefeller Foundation is contributing to the expense of this research with a grant of \$2,000, which follows earlier grants totaling \$6,000 for the development of research in the social sciences.

THE DEVELOPMENT OF RESEARCH TALENT

In the long run both the building of a science of social behavior and the application of the scientific approach to social problems depend on the discovery and training of able social scientists. The Foundation seeks to assist this never-ending effort, largely through continuing the support it has given for many years to programs of predoctoral and postdoctoral training fellowships. For information on the fellowships given directly by the Division of Social Sciences and those awarded by the Social Science Research

Council with funds provided by the Foundation, see the section on Fellowships, pages 444 to 446.

CANADIAN SOCIAL SCIENCE RESEARCH COUNCIL

Research, Publications, Fellowships and Professorial Leaves

The Canadian Social Science Research Council was created in 1940 for the purpose of encouraging and coordinating research in human relationships, history, government, economics, psychology, sociology, geography, population problems, and legal and constitutional matters. The support given to the council by The Rockefeller Foundation since 1942 was renewed in 1951 with two grants. The first is C\$22,000 for grants in aid of research and for publications. Another grant of C\$28,000 is for fellowships and professorial leaves.

The program is directed by a council of 16 members under the chairmanship of Professor Jean-Charles Falardeau. Four members represent the Canadian Historical Association, the Canadian Committee of the International Geographic Union, the Canadian Political Science Association and the Canadian Psychological Association. Eight others are Canadian historians, economists, psychologists, sociologists, geographers and political scientists. The remaining four are Dominion and provincial civil servants.

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

In-Service Training Fellowships

The Rockefeller Foundation has made a grant of \$9,000 to the United Nations Economic Commission

for Europe for the in-service training scholarship program which the commission administers at its Geneva headquarters. Previous grants for the same program were made in 1948 and 1950.

Students selected as in-service training scholars work under the direct guidance of the Economic Commission's staff of international economists.

Thus far in the program awards have been made to young economists from Yugoslavia, Finland, Norway and Austria where training facilities are for the most part inadequate. The commission is using the current Foundation grant for appointments for 1951-1952.

INSTITUT DE SCIENCE ÉCONOMIQUE APPLIQUÉE

In-Service Training Scholarships

The Institut de Science Économique Appliquée in Paris has successfully experimented with in-service training scholarships as a method of giving specialized preparation to qualified economics students from France and Western Europe. The scholarships provide a two-year course of training, with six months devoted to intensive reading and discussion of basic economic works, a year devoted to a research project based on the handling of first-hand materials and a final six months spent in preparing the results for publication.

Since 1946 The Rockefeller Foundation has contributed \$46,568 to the support of the Institut de Science Économique Appliquée. The 1951 grant of \$10,000 provides four more scholarships during the two-year period beginning October 1, 1951.

AMERICAN ECONOMIC ASSOCIATION

Graduate Training of Economists

The American Economic Association is currently concerned with problems of training at the graduate level and proposes to sponsor a thoroughgoing study of such practices. The purpose of the study is to clarify objectives, provide the facts about current practices, develop standards and in general point the way for an improvement in both the substance and the form of graduate training for economists.

While the study is not meant to eliminate the diversity in graduate programs at the various institutions, it would formulate minimal standards and basic conditions which an institute should meet before offering graduate training to candidates for either an M.A. or a Ph.D. degree. The study would also provide information and principles on the basis of which faculties of individual institutions could undertake self-criticism of their existing programs.

Professor Howard R. Bowen of the University of Illinois is directing the 18-month study for which The Rockefeller Foundation has made a grant of \$16,000. Professor Bowen and a small committee of qualified economists, chosen as representatives of diverse economic points of view, will prepare a report on their findings. The report will later be published by the American Economic Association.

COLUMBIA UNIVERSITY

Training in Social Research

There is growing concern among professional social scientists over the low yield of creative research men

coming out of the nation's graduate schools, especially as the demand for well-trained research workers in the social disciplines has increased so rapidly. There is a need in government and business for persons better qualified to attack applied research problems and also a need in the universities for persons better equipped to advance basic knowledge.

After examining the problems involved, social scientists at Columbia University are launching a two-year trial program for professional training in social research. Professor Paul Lazarsfeld, chairman of the Department of Sociology and formerly director of the Columbia Bureau of Applied Social Research, will direct this program with the assistance of a full-time codirector and two full-time research associates.

During the two-year trial period efforts will be made to prepare and try out special teaching materials for systematic training in social research. These should constitute helpful training tools for the use of other universities as well as Columbia. It is expected that final products will be a casebook of classical writings in political science and sociology, reanalyzed in terms of present-day problems and research techniques; a set of "synthetic surveys" with explicit directions for their use in teaching systematic survey analysis; and a casebook of significant research projects, with analysis and codification of the procedures used.

In 1951 The Rockefeller Foundation made a grant of \$60,000 to Columbia University for this program, for the period extending from February 1, 1952 through September 30, 1954. This fund is for professional salaries and for the expenses of preparing

training materials. Columbia University is providing the same amount for other related expenses.

GRANTS IN AID

Seventy-seven separate projects in the social sciences were allotted grants in aid from funds set aside for this purpose during 1951. The 77 grants amounted to a total of \$275,750 and were distributed among 14 different countries.

AUSTRALIA

Professor J. W. Davidson, Canberra University College; \$725 to enable Professor Davidson to obtain a direct acquaintance with centers of Far Eastern and Pacific studies in the United States, Vancouver, Canada and Honolulu, Hawaii

AUSTRIA

Austrian College Society, Vienna; 78,000 Austrian schillings, approximately \$3,200, in support of the society's Institute for Contemporary European Cultural Research

CANADA

McGill University, Montreal:

In support of Dr. Jan M. Novotny's research in the field of public finance; \$3,500

Institute of International Air Law; \$3,000 to enable Mr. David Morgan Hughes, University of London, to spend a year at the institute

University of Toronto:

A general fund of \$4,000 to be used for the furtherance of research in the social sciences

To enable Professor S. D. Clark to complete his contribution to the Alberta Social Credit Studies and to edit other volumes in the series; \$7,500

To enable Professor Edgar McInnis to study the effort to achieve a general postwar settlement;
\$2,500

DENMARK

Professor Theodor Geiger, University of Aarhus; \$1,050 to enable Professor Geiger to visit social science research centers in the United States

University of Copenhagen; \$1,300 for the purchase of American books and other research materials for the university's Division of Sociology

ENGLAND

Professor S. Herbert Frankel, University of Oxford; \$5,000 toward the costs of a visit to the United States, Jamaica, Brazil and South and Central Africa

Dr. Ian M. D. Little, University of Oxford; \$600 to enable Dr. Little to visit American specialists in the field of welfare economics

National Institute of Economic and Social Research, London; £3,000, approximately \$9,000, in support of Mr. G. E. Fasnacht's research project, "The History of Liberty in the Acton Manuscripts"

Royal Institute of International Affairs, London; \$4,890 toward the cost of work on the *History of the War and the Peace Settlement* by Professor William H. McNeill of the University of Chicago

University of London; £1,600, approximately \$4,800, for the use of the Town Planning Department of University College in support of a study by Mrs. Ruth Glass of the contribution of the social sciences to town planning

Professor Charles H. Wilson, University of Oxford; \$700 to permit Professor Wilson to visit American centers of political science research

FRANCE

Centre d'Études de Politique Étrangère, Paris; \$2,000 to enable the secretary general, Mr. Jacques Vernant, to visit American research centers in international relations

École Polytechnique, Paris; 1,800,000 francs, approximately \$5,400, for the salaries of two assistants in the econometric and statistical laboratory under the direction of Professor François Divisia

Institute of Statistics, University of Paris; 1,200,000 francs, approximately \$3,600, for the salary of a research assistant for Professor Maurice Allais over a two-year period

Institut de Science Économique Appliquée, Paris; \$10,000 toward the costs of studies in the field of social accounting, the supplementation of salaries and secretarial assistance

Professor Henri Lavaill, École Nationale des Ponts et Chaussées, Paris; \$3,500 for visits to major American public utility undertakings and study of American teaching methods

National School of Public Administration, Paris; \$4,300 to enable Professor Roger Levy to study, in the United States and Japan, relations between the United States and countries of the Far East since 1925

GERMANY

German Society for Foreign Studies, Munich; \$1,000 for the purchase of research materials from abroad

Professor Walther Hoffmann, University of Münster; \$3,800 to enable Professor Hoffmann to visit research centers in the United States

Institute for Research in Economics, Munich; \$1,000 for the purchase of research materials from abroad

Institute for Social Research, University of Frankfurt; \$5,000 toward the cost of securing non-German scholars in its research and training program

School for Political Sciences, Munich; \$2,000 for the purchase of books and periodicals within Germany and from abroad

Soziographisches Institut, Frankfurt; \$9,500 for the development of empirical research in the field of sociology

JAPAN

Professor Takeo Matsuda, Hokkaido University; \$2,000 to enable Professor Matsuda to visit centers and leaders in agricultural economics in the United States and Europe

NETHERLANDS

Dr. T. Van den Brink, Netherlands Central Bureau of Statistics, The Hague; \$500 to enable Dr. Van den Brink to visit centers of demographic research in the United States

Dutch Coordinating Committee for Cultural Relations with Germany; \$1,500 toward the expenses of the committee's program of promoting better relations between groups in the two countries

Netherlands Economic Institute, Rotterdam; \$1,400 for publication of the proceedings of the 1950 Input-Output Conference held in Driebergen, Holland

NORWAY

University of Oslo; 3,000 Norwegian kroner, approximately \$450, toward the costs of a study of municipal administration in Norway, under the direction of Professor James A. Storing

SWITZERLAND

Dr. Karl Brunner; \$810 to enable Dr. Brunner to complete his period of study in the United States

United Nations Economic Commission for Europe, Geneva; \$6,000 for the costs of including two Asian stipendiaries in the in-service training scholarship program

Dr. Albert Hunold, Swiss Institute of International Studies, Zurich; \$2,350 toward the costs of visiting research institutions in the United States

Professor Max Silberschmidt, University of Zurich; \$2,500 to enable Dr. Silberschmidt to visit centers of economic research in the United States

SYRIA

Syrian University, Damascus; \$2,500 toward the purchase of books in the social sciences

YUGOSLAVIA

Professor Mijo Mirković, University of Zagreb; \$1,400 toward additional expenses of travel in Italy and France in connection with Professor Mirković's study of agricultural economics

UNITED STATES

American Bar Association, New York City; \$1,000 toward the expenses of the third annual meeting of the Conference of Chief Justices

American Historical Association, Washington, D. C.; \$2,500 toward the travel and conference expenses of the Committee on the Historian and the Federal Government

Professor Hugh Borton, Columbia University, New York; \$2,050 for a reconnaissance of Japanese organizations and personnel in the field of international organization and relations

Columbia University, New York:

Bureau of Applied Social Research; to enable Dr. Seymour M. Lipset to make a study of participation of members of a labor union in its governmental process; \$8,000

To permit Professor Charles W. Everett to visit England to complete his study of the *Constitutional Code* of Jeremy Bentham; \$3,200

To supplement the expenses of a visit to India by Professor Kingsley Davis; \$900

Toward the expenses of the university seminar on the Theory and Practice of Organization and Management in integrating in one volume a series of papers and proceedings on *Measures of Organization*; \$6,500

Toward the costs of Professor Schuyler Wallace's visit to the Near and Middle East, Pakistan and India; \$2,000

Cornell University, Ithaca, New York; \$4,750 in support of Dr. Rudolf Loewenthal's project, "The Turkic Mohammedans of the Soviet Union: Bibliographic Survey and Pilot Study"

Free Trade Union Committee, American Federation of Labor; \$6,000 toward the costs of a visit to the United States by three Turkish trade union leaders

Harvard University, Cambridge, Massachusetts:

For a translation of Professor Eli Heckscher's volume on Swedish economic history, *Svenskt Arbete och Liv*, under the supervision of Professor Alexander Gerschenkron of the Department of Economics; \$2,500

For the completion of a series of studies on labor movements and collective bargaining in a number of Western European countries; \$10,000

For use by the Laboratory of Human Development for additional field work and analysis in connection with its child development study; \$5,900

Institute for Advanced Study, Princeton, New Jersey:

To enable Professor F. W. D. Deakin, Warden of St. Anthony's College, Oxford, to visit leading American universities and research centers in the field of international relations; \$1,100

To enable Professor Jean-Jacques Chevallier, University of Paris, to visit several leading American universities and research centers in the field of political history; \$1,200

To permit Professor Michael Postan, University of Cambridge, to spend four and one-half months at the institute and to visit American centers of research in economic history; \$2,850

The Johns Hopkins University, Baltimore, Maryland; \$7,500 toward the completion of Dr. W. S. Woytinski's study, "America in the Changing World"

Professor Frank H. Knight, University of Chicago, Illinois; \$2,200 to permit Professor Knight to visit Europe and the Near East for studies in the field of comparative law

Professor Friedrich A. Lutz, Princeton University, New Jersey; \$1,300 toward the costs of travel and other expenses in connection with research in Europe on economic developments in Western Germany since the currency reform

New School for Social Research, New York:

For use by the Institute of World Affairs toward the costs of the completion of editorial work on *The Domestic Determinants of International Trade*, by Hans Neisser and Franco Modigliani; \$2,000

Toward the cost of Dr. Hans Neisser's travel in connection with the study of postwar international trade problems in Europe; \$1,250

New York University; \$8,760 toward a study, under the direction of Professor H. Ashley Weeks, on the effectiveness of a program of short-term treatment of juvenile offenders

Princeton University, New Jersey; \$1,500 for use by the Graduate School to permit Mr. Hanna Rizk of the American University at Cairo to spend a second year of study in the United States

Stanford University, California:

For the use of the Hoover Institute and Library, to enable Dr. Evsey S. Rashba to complete his study of Soviet law; \$4,000

Food Research Institute; to enable Dr. Jozo Tomasevich to complete his study, "Yugoslav Agriculture and Peasantry During the Interwar Period"; \$750

Toward the cost of analysis of data relating to sex adjustment in marriage, under the direction of Professor Paul Wallin; \$4,475

Professor Edward C. Tolman, Berkeley, California; \$4,000 toward the costs of preparing a definitive statement of his system of psychology

University of California, Berkeley; \$1,515 to enable Dr. Arthur Geddes of the University of Edinburgh to take up his appointment as visiting professor of geography

University of Chicago, Illinois:

For the use of its Committee on Communication toward the costs of an analysis of voting patterns; \$2,500

In support of research planning in the field of old age; \$5,000

Toward the costs of continuation of work by William Stephenson on the development and refinement of Q-technique, a variant of factor analysis; \$2,500

University of Michigan, Ann Arbor; \$8,500 for the use of the Research Center for Group Dynamics toward the costs of a pilot study of the learning and other experience of a group of German exchange students and of designing a training and measurement program to aid in further similar studies

University of Minnesota, Minneapolis; \$3,375 to permit Dr. Leon Festinger to spend three months as consultant to the Institute for Preventive Medicine in Leiden

University of Missouri, Columbia; \$3,250 for preliminary work in connection with a proposed study in Missouri of the rural church as a social institution

University of Pennsylvania, Philadelphia; \$10,000 for analysis of data on internal migration in the United States and for planning a study of the redistribution of the labor force, capital and economic production

World Peace Foundation, Boston, Massachusetts; \$7,000 toward the expenses of a Canadian and American conference on foreign relations at Niagara Falls, Ontario

Yale University, New Haven, Connecticut; \$3,650 to enable Professor Wu Wen-tsao to conduct sociological research in Japan and to take up a one-year appointment at Yale University

To universities and research organizations in Europe; \$800 to cover the costs of distributing 43 sets of *Studies in Social Psychology in World War II*

Director's fund of \$5,000 for travel, honoraria, books, journals and other research and miscellaneous expenses

DIVISION OF HUMANITIES

DIVISION OF HUMANITIES

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DIVISION OF HUMANITIES

ON pages 76 to 91 in the President's Review section of this report there is given an extensive account of the principles, aims and programs of the Division of Humanities. There is also presented in that section a brief résumé of some of the important 1950 and 1951 projects in the humanities.

The pages that follow contain details on grants made in 1951. These grants totaled \$1,658,072. The order of presentation follows the order of discussion in the President's Review. In 1951 there were no major grants classified under Language, Logic and Symbolism.

INTERCULTURAL UNDERSTANDING

CONFERENCE ON THE INTERPRETATION OF ARAB TRADITION

The interests of The Rockefeller Foundation in the development of studies of the Near East which aim at creating a better understanding of the cultures of that region have been reflected in grants over a period of more than 15 years. But the opportunity of assisting Near Eastern scholars in the contribution which they could make to this process is one that has materialized only since the end of World War II.

During these years a better acquaintance with the scholars of the Arab countries has made clear the importance of the contribution they could make. In

almost every Arab country there are now to be found scholars who are both thoroughly schooled in Arab tradition and trained for its interpretation by advanced studies in the Near East and in the West. Keenly aware as these scholars are of the evolution of Arab thought during the years in which the Arab countries have achieved independence and full participation in world affairs, they are equally aware of the fact that the Arabs of today are in considerable measure different from the image of the Arab which prevails in the world at large. Thus many such scholars, while their previous training and research dealt with earlier periods of Arab life and thought, are now convinced of the importance of a new interpretation which would more accurately portray the Arabs as they are today.

During 1951 the possibility became evident that through discussions among Arab scholars agreement on scholarly work needed for that outcome might be reached. As a basis for arranging discussions, the Foundation appropriated \$20,000 in 1951 for such expenditures as seemed to the officers of the Foundation most advantageous in working toward this general purpose. In 1951 discussions were in progress which looked toward the assumption of responsibility for such arrangements by scholarly organizations of the Arab world.

SPECIAL GRANT-IN-AID FUND

Visits to Islam

In any dispassionate view it has to be recognized that knowledge in the West of contemporary thought

within Islam is hardly commensurate with the importance of a religion that constitutes a way of life for as many as 350,000,000 of the world's population. Certainly an understanding of Islam as it is today is fundamental for any real comprehension of this great section of the world's population. There are, to be sure, outside Islam a small but highly qualified number of Islamicists, but they would be among the first to agree that even their knowledge of contemporary trends in Islam leaves something to be desired. In a sense it is hardly an exaggeration to say that because of the war years and the subsequent difficulties in travel, communication between Islam and its interpreters in the rest of the world, particularly in the West, has been seriously impaired.

With a view to re-establishing such contact, the Foundation in 1951 appropriated a special fund of \$30,000 to enable qualified Islamicists to revisit Islam and thus to study at first hand the thought and movement that characterize Islam today. Allocations from this fund during 1951 enabled Dr. A. J. Arberry, Adams Professor of Arabic at the University of Cambridge, England, to visit French and Spanish Morocco, Algeria and Tunisia during a five-month trip; Dr. Lewis V. Thomas, assistant professor of oriental languages at Princeton University and coauthor of *The United States and Turkey and Iran* to visit Turkey during a four-month period to study the present status of Islam; Dr. Wilfred Cantwell Smith, professor of comparative religion at McGill University, to revisit Turkey, Pakistan and India with a similar intent. During 1951 arrangements were being made

to bring the total of such visits to approximately ten before the termination of the appropriation in June 1953.

MC GILL UNIVERSITY

Islamic Studies

Likewise in the interests of creating a better understanding of Islam as it is today, McGill University, Montreal, Canada, with the aid of a grant of \$214,800 made by The Rockefeller Foundation during 1951, established an Institute of Islamic Studies under the direction of Dr. Wilfred Cantwell Smith, professor of comparative religion in the Faculty of Divinity. Dr. Smith has for some years been principally concerned with studies of contemporary Islam and, in fact, in 1949, with the aid of a smaller grant from the Foundation, undertook an investigation of this subject across the Muslem world. Established within McGill's Faculty of Graduate Study and Research, the Institute of Islamic Studies will attempt, through the close collaboration of Muslem and non-Muslem scholars, an authoritative interpretation of the role of Islam in the contemporary world. The plan is that during each year of the Foundation's grant, which will be available until August 1957, there will be invited to McGill both older and younger Muslem scholars who, by study and discussion with qualified Western scholars and students, can, it is hoped, achieve this end. The grant includes provision for the salaries and travel of scholars coming to McGill from the Muslem world and for the participation of non-Muslem scholars and students.

The institute will operate with the help of an advisory committee which includes Dr. F. Cyril James, principal and vice-chancellor, Dr. J. S. Thomson, dean of the Faculty of Divinity, and Dr. D. L. Thomson, dean of the Faculty of Graduate Studies at McGill.

UNIVERSITY OF DURHAM

Modern Near Eastern Cultures

The importance of oriental studies in Great Britain received due recognition in the years immediately following World War II in the report of a royal commission under the chairmanship of Lord Scarborough and consequently known as the Scarborough Commission. In accordance with the recommendations of this report, the British universities were invited to submit proposals for the development of such studies to the University Grants Committee, which administers funds provided by the British Treasury. As one of the nine university centers selected to develop work in this field, the University of Durham established a School of Oriental Studies, under the direction of Dr. T. W. Thacker, for the particular purpose of advancing the study of the modern Near East. Funds from the University Grants Committee made possible the recruitment of a well-qualified staff and the building up of requisite library facilities.

It became evident, however, to this group at Durham that a realistic study of the contemporary cultures of the Near East called for the discovery and assembling of current materials, many of which do not readily come to the attention of Western scholars.

It was therefore proposed that the group at Durham should devote its particular attention to what was termed the "documentation" of the study of the contemporary Near Eastern cultures. In the first place, agreement is to be reached as to features of the life of the Near Eastern cultures which are salient for an understanding of them. As agreement is reached on this point, an inquiry is instituted as to what materials are essential for interpretative study. The materials then decided on are to be assembled at Durham for use there in teaching and research. Finally, a mimeographed bulletin is to be prepared on the results of such work for distribution to other interested centers of Near Eastern studies. A grant of \$29,700 toward the costs of this project through January 1955 was made by the Foundation in 1951.

TOKYO UNIVERSITY AND STANFORD UNIVERSITY

American Studies

Tokyo University and Stanford University have been cooperating since 1950 in a summer training program in Japan for advanced students and professors. The aim is to develop an interest in American studies throughout Japan and to provide a more permanent place than presently exists for study of the United States in the Japanese system of higher education.

The second summer session in American studies under the joint auspices of Tokyo University and Stanford University was held in 1951 in Japan at Tokyo University. The program was supported by previous grants of \$4,000 to Tokyo University and



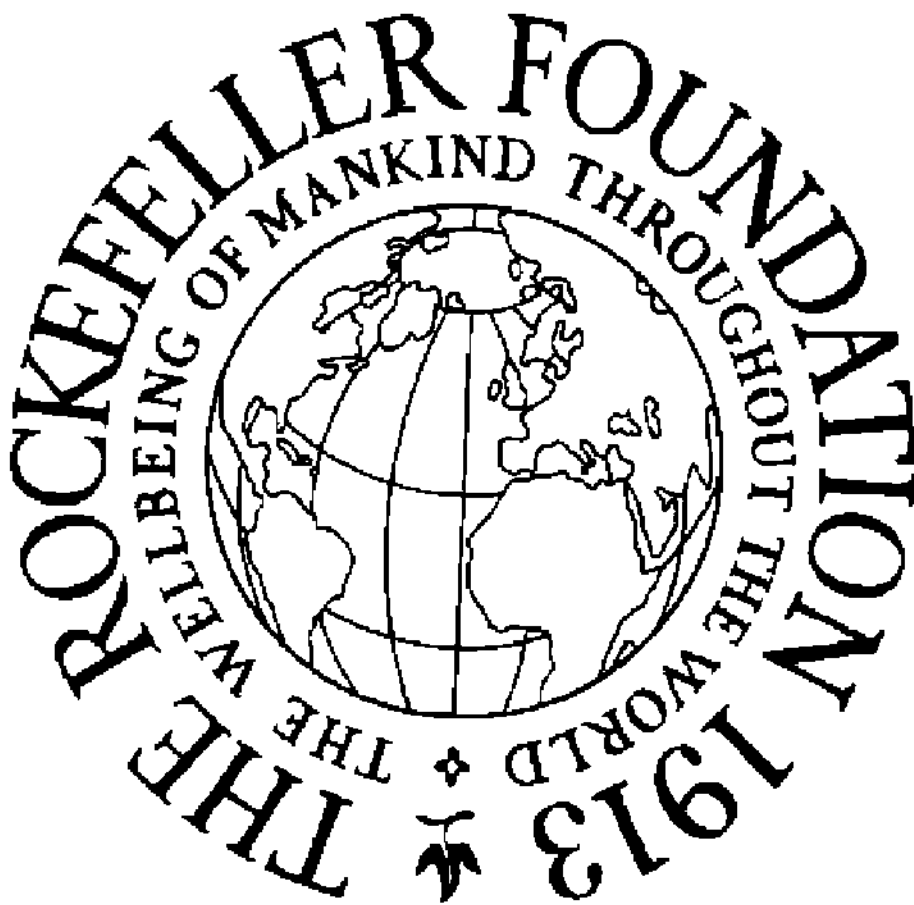
Photograph Excised Here

Members of the second seminar in American studies at Tokyo University visit Oni-Oshidashi, Karuzawa, Japan

Pan American Institute of Geography and History, Mexico, D. F.; the Gallery of Historians



Photograph Excised Here



"Dancing Children,"
an oil painting on wood
by South African
Douglas O. Portway,
who visited the United
States under the inter-
national arts program
of the Institute of In-
ternational Education

Photograph Excised Here

Craft seminars arranged by the New Dramatists Committee, Inc., New York, provide
a meeting ground for the journeyman-playwright and the master dramatist



Photograph Excised Here

\$20,000 to Stanford University, made by The Rockefeller Foundation on the recommendation of the Division of Social Sciences and the Division of Humanities, for expenses and fellowships for visiting professors. Five American professors in the social sciences and the humanities participated in a four-week program which was developed along lines similar to the 1950 curriculum, fully described in The Rockefeller Foundation Annual Report for 1950, pages 252 to 253, and in the President's Review section of this report, pages 81 to 82.

In 1951 an additional \$160,000 was appropriated for the continuation of these summer seminars under the leadership of Tokyo University and Stanford University over a period of five years.

UNIVERSITY OF CALIFORNIA AND
AMERICAN COUNCIL OF LEARNED SOCIETIES

Korean Studies

In 1951 the Institute of Asiatic Studies of the University of California held a special six-week summer seminar in Korean studies with three prominent scholars participating in the teaching: Dr. L. George Paik, Minister of Education, Republic of Korea, and former president of the Chosen Christian College; Mr. Kyoichi Arimitsu, professor of archaeology at Kyoto University in Japan; and Dr. Edgar A. J. Johnson, director of the Korea Division of the Economic Cooperation Administration. The Rockefeller Foundation appropriated \$6,325 to the University of California to make this summer seminar possible and gave \$7,000 to the American Council of Learned

Societies for special study grants to enable qualified teachers and graduate students from all parts of the country to attend the sessions at the University of California.

UNIVERSITY OF COLOGNE

American Studies

Throughout Western Germany there is an increasing desire and a growing need for accurate knowledge of the United States. The University of Cologne, situated between Bonn, the federal capital, and the industrial Ruhr district, has demonstrated its interest by setting up an Institute of American Studies which will provide academic work in American literature, history, sociology, law and economics. To assist this program, The Rockefeller Foundation in 1951 made a grant of \$15,000 to the university, available over a two-year period, for expenses connected with obtaining visiting professors from the United States, especially in the field of history, and for the acquisition of books and library materials.

The University of Cologne will pay full salaries in German marks to the visiting professors, and the Foundation's grant will be used for the necessary dollar expenses of the guest professors.

LIBRARY OF CONGRESS

Accessions Lists

For some years the Library of Congress has been organizing and cataloguing its extensive holdings of Slavic materials. In addition, it has taken on the

responsibility for preparing an inventory of the holdings of other libraries.

A *Monthly List of Russian Accessions*, started in 1948, includes materials currently published in the Slavic countries, particularly the Soviet Union, and received at the Library of Congress and at other key research libraries. This work is to be expanded to include approximately 25,000 listings a year of Russian publications mentioned in Soviet periodicals but not yet received by these libraries.

In cooperation with the National Committee for a Free Europe, the Library of Congress is also issuing a bimonthly *East European Accessions List* on the pattern of the Russian list. Coverage is to extend to publications received from Albania, Bulgaria, Czechoslovakia, Hungary, Poland, Rumania and Yugoslavia.

Toward the costs of preparation and publication of the *East European Accessions List* and expansion of the *Monthly List of Russian Accessions* through August 31, 1952, a grant of \$8,700 was made to the Library of Congress by The Rockefeller Foundation, on the recommendation of the Division of Humanities and the Division of Social Sciences.

HUMANE VALUES

NEW DRAMATISTS COMMITTEE, INC.

General Support

In October 1951 a grant of \$47,500 was made to the New Dramatists Committee, Inc., by The Rockefeller

Foundation toward the general support of its program over a period of three years. The New Dramatists Committee is an organization of established playwrights which is endeavoring to provide improved opportunities for young playwrights to develop their skill in close association with the theater and the more experienced members of the profession. The basic program to which assistance was given by The Rockefeller Foundation enables a selected group of young playwrights to follow new plays through their preparation for showing on Broadway and to discuss the problems encountered with the authors and others associated with the production. This program is in direct association with the recently established Elinor Morgenthau New Dramatists Workshop, under the supervision of the same committee.

INSTITUTE OF INTERNATIONAL EDUCATION

Visiting Artists Program

A grant of \$25,905 was made by The Rockefeller Foundation in 1951 to the Institute of International Education to assist the institute in bringing to the United States 24 young artists from other countries during the period January to June 1952, for purposes of study and observation. These artists, all under 35 years of age, represent different fields of art, including painting and sculpture, musical composition and conducting, the theater and the literary arts.

The participants are divided into three groups of eight members each. A separate program is arranged for each group, with the three-month visit divided into an orientation period of approximately

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two weeks, a period of individual work, travel and observation of about eight weeks, and a final evaluation period of approximately two weeks.

Through such visits by artists from other countries, it is anticipated that the visitors not only can learn more of American work in the field of the arts but also, by contact with Americans and with artists from different countries, can become acquainted with the common interests and objectives of the arts in different areas of the world.

COMMISSION ON HISTORY, PAN AMERICAN
INSTITUTE OF GEOGRAPHY AND HISTORY

History of the Americas

The Commission on History of the Pan American Institute of Geography and History is an organization established as a result of international agreement and receives its basic support from contributions by the members of the Organization of American States. For some time the commission has been concerned with the problem of developing interpretation of the history of the Americas on a basis which would provide effective integration of concepts with regard to the various cultures — indigenous, Spanish, Portuguese, French or English in origin — which exist together on the American continents.

In 1951 The Rockefeller Foundation made a grant of \$30,000 to the Commission on History for work on this problem, over the period ending December 31, 1953, by three groups which concentrate on pre-Columbian, colonial and modern history, respectively. These three teams will endeavor to work out various

alternative ways in which history of this broad character may be written. The results are to be presented at the meeting of the Commission on History to be held in Mexico in 1954.

COMMISSION ON HISTORY, PAN AMERICAN
INSTITUTE OF GEOGRAPHY AND HISTORY

History of Ideas

An additional grant of \$15,000 was made in October 1951 to the Commission on History for a research program under the direction of its Committee on the History of Ideas for the period ending December 31, 1954. The Committee on the History of Ideas was established as a result of a resolution of the first Pan American meeting on history held in Mexico in 1947 by the Commission on History of the Pan American Institute of Geography and History. Its chairman is Dr. Leopoldo Zea, professor at the National Autonomous University of Mexico. The grant will be used to support a number of research studies to be undertaken by scholars in several different countries in the general field of the history of ideas during the period between 1875 and 1925, and with emphasis on comparison between developments in different countries of the Americas.

COLEGIO DE MÉXICO

Contemporary Mexican History

The Colegio de México received a grant of \$18,192 for research and a training seminar on contemporary Mexican history, under the direction of Dr. Daniel Cosío Villegas. The Colegio de México's research and

training program is focused on the preparation of a six-volume history dealing with the political, economic, social and cultural life of Mexico from 1867 to 1910.

NATIONAL INSTITUTE OF ECONOMIC AND
SOCIAL RESEARCH

de Tocqueville Papers

A new edition of the complete works of Alexis de Tocqueville, under the editorship of Mr. Peter Mayer, is being published by Gallimard in France. Two volumes of *Democracy in America* have already been published. *English Correspondence* and *The Ancient Regime* are in press. The estimated nine additional volumes to be completed for publication include de Tocqueville's other correspondence, both public and private, and his political and philosophical writings.

Mr. Mayer, a British national, has been accorded by the present Comte Jean de Tocqueville the privilege of access to all the family papers and records. To enable Mr. Mayer to continue editing the de Tocqueville writings, The Rockefeller Foundation appropriated \$9,500 to the National Institute of Economic and Social Research, London, which is sponsoring the project. The three-year grant will be available until the end of October 1953.

From the beginning, this project has had the cooperation and support of leading scholars and historians of ideas in Great Britain and France. An advisory committee comprising British and French scholars guided the work in its early stages. A national commission has been set up by the French government for the continued support of this task, and the

Centre National de la Recherche Scientifique has provided a full-time assistant for Mr. Mayer and has arranged for the collection of documents in suitable working quarters in the Institut de France.

ABRAHAM LINCOLN ASSOCIATION

Edition of Lincoln Writings

The Abraham Lincoln Association is a nonprofit corporation located in Springfield, Illinois, whose purpose is to collect and disseminate information on all phases of the life of Abraham Lincoln. Since 1924 the association has published the *Abraham Lincoln Quarterly* and an annual volume; these have made substantial contributions to the Lincoln story and to American history of the nineteenth century.

An important project of the association is the preparation of an eight-volume annotated edition of the writings of Abraham Lincoln, which will be published by the Rutgers University Press. Since this project was initiated, \$42,000 has been contributed to it by The Rockefeller Foundation, the remainder of the cost having been raised through contributions to a special fund of the association. It is expected that the work will be completed during 1952. Toward the expenses of the annotated edition of the writings of Abraham Lincoln, The Rockefeller Foundation in 1951 made an additional grant of \$12,000.

COLUMBIA UNIVERSITY

Biography of Booker T. Washington

Columbia University's Council for Research in the Social Sciences received an appropriation of \$15,000

from The Rockefeller Foundation for the preparation of a biography of Booker T. Washington by Mr. Marquis James. The work, which is being aided for a three-year period, will utilize a wide range of previously untapped source material. Mr. James — biographer of Sam Houston, Andrew Jackson, John Nance Garner and Alfred I. DuPont — has twice received the Pulitzer Prize for biography.

PRINCETON UNIVERSITY

Military History

For the development of a new course in military history, \$20,000 was appropriated to Princeton University. Responsibility for the presentation of military history required by the ROTC curriculum has been taken over by the Department of History. Plans include stress on a high intellectual level of instruction, a more complete understanding of contemporary military operations and a study of the ways in which military preparedness affects present-day society.

Dr. Gordon Turner, who directs the work and who is preparing a body of new readings, is a former United States Army captain with experience in compiling military historical data. All of the professors on the advisory committee have served with the armed forces. Consultants working with this group are scholars from the Institute for Advanced Study at Princeton, from Harvard University (naval history), Yale University (intelligence) and the United States Army Historical Division. Foundation aid toward the program in military history covers expenses for

personnel, travel and the purchase of books and related materials.

UNIVERSITY OF CAMBRIDGE, DOWNING COLLEGE

English Studies

For the use of Downing College, \$6,900 was appropriated to the University of Cambridge, England, toward the salary of an assistant to the director of English studies, Dr. F. R. Leavis. A leading center of English studies, particularly literary criticism, Downing College draws students from Great Britain, America and Continental Europe. Dr. Leavis' work as a teacher and as editor of the literary quarterly, *Scrutiny*, is now recognized as a stimulating influence in the growth of British literary criticism. The Rockefeller Foundation has aided these studies at Downing College since 1946. Current support for his assistant, Mr. H. A. Mason, through mid-1955 allows Dr. Leavis increased flexibility in his program.

UNIVERSITY OF CHICAGO

Special Faculty Seminar

The general education program of the College of the University of Chicago has been evolving for some 20 years, with changes and alterations based on experience and new insights. The integration of knowledge has been a basic problem.

A first attempt at unification of the disciplines and values involved was made when the college reduced the number of courses offered and developed general courses in major fields such as the humanities, the social sciences, the natural sciences and mathematics,

with auxiliary courses in English and other languages. Further amalgamation was effected during the academic year 1949–1950. A course entitled Observation, Interpretation and Integration was offered.

The college is particularly interested in the role played by history and philosophy in a liberal education. During the 1951–1952 academic year a special faculty seminar entitled *The Uses and Mutual Relations of the Disciplines of History and Philosophy as Means of Integration within a Liberal Education* is examining problems on history and philosophy in relation to each other and to other disciplines. The seminar was made possible by a grant of \$15,150 from The Rockefeller Foundation to the College of the University of Chicago. Fundamental problems discussed include: the source, nature and validity of historical generalizations; the relationship between existence and value; and the relationship between historical inquiry and values. The college is confident that the seminar will be another step in the development of new concepts and their application in teaching for the purpose of achieving integration in its program.

ANTIOCH COLLEGE

General Education

Antioch College in Yellow Springs, Ohio, has emphasized general education since 1921, when a program of required courses “to familiarize the student with the heritage of man” was developed. Today’s Antioch students receive a parallel general education of a quite different character through the college’s

cooperative work plan, as well as through its unusually extensive program of student participation in community government and college administration. The college records since the initiation of these activities provide an unusually rich source for studying the significance of this general education program. Toward such a study The Rockefeller Foundation made a grant of \$15,900 in 1951.

AMERICAN COUNCIL OF LEARNED SOCIETIES

Personnel in the Humanities

During the last several years extensive studies have been made of the demands for and the possible supply in the United States of personnel with unusual academic training. Because of the importance of having the humanities adequately represented in such studies, The Rockefeller Foundation in 1949 made a grant of \$31,000 to the American Council of Learned Societies to permit the addition to its staff of Mr. J. F. Wellemeyer, Jr., as staff adviser on personnel studies. In view of the effective work done by the staff adviser, The Rockefeller Foundation in 1951 made an additional two-year grant of \$34,000 for continuation of this activity.

AMERICAN COUNCIL OF LEARNED SOCIETIES

Special Fellowships

During 1951 other funds were given to the American Council of Learned Societies by The Rockefeller Foundation to relieve a critical situation which has arisen among the younger humanities personnel. Educational institutions have estimated that there

will be a drop in enrollment of about 25 per cent for the next two-year period, as the direct result of the national mobilization of manpower, and they are decreasing their budgets accordingly. It has been fairly reliably estimated that the number of academic personnel facing dismissal in the humanities will be in the neighborhood of 7,500. The levels most affected are those at or under the status of assistant professor.

Many of the younger humanists who are threatened with dismissal have already been delayed in their careers by World War II. They are likely to be discouraged from returning to the academic ranks by the higher wages offered in government or civilian positions and by the fact that their academic services are charged as expendable in any period of crisis. Advanced students now selecting their professions may also be influenced by these factors. As a result, the council believes, the ranks of the teaching staff in the humanities, already depleted by the gap caused during the years of World War II, will suffer further reduction. Unless some of the younger scholars of the age group now 28 to 32 are retained on the academic scene, a great disparity in age and outlook may develop between the senior personnel on permanent tenure and those who will be called upon after the present emergency to fill the lower faculty ranks in the humanities.

To relieve the present emergency, two grants were made in 1951 by The Rockefeller Foundation to the American Council of Learned Societies. One of these provided \$200,000 for a special program of fellowships in the humanities during the period ending October

1, 1952. Approximately 50 fellowships are to be awarded by the council on a selective basis in an amount equal to the individual's salary for the past year but in no case exceeding \$5,000. Appointments will be for one year. The second grant, also in the amount of \$200,000, was made for later allocation during the period ending October 1, 1953. The program should make a significant contribution to the development of scholarship and alleviate, to some extent, the precarious position of the humanists.

AMERICAN COUNCIL OF LEARNED SOCIETIES

Pacific Coast Committee for the Humanities

The Pacific Coast Committee for the Humanities was established five years ago by the American Council of Learned Societies in the belief that the geographical unity of the West Coast made it possible to attack certain problems more effectively at the regional level.

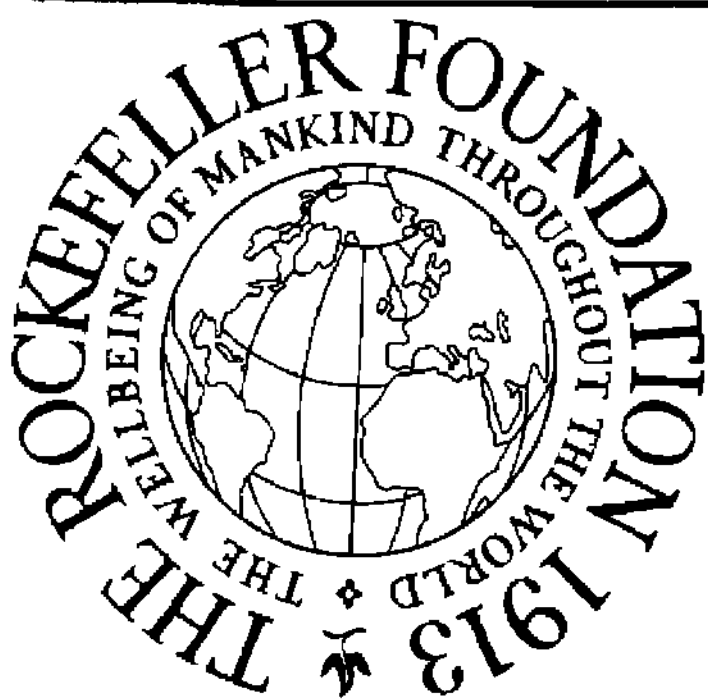
The objectives of the committee are to stimulate within the humanities a keener sense of the inter-relatedness of the disciplines and of the opportunities to enrich the study and teaching of each of the various subjects by orienting them to related ideas in other fields, and to encourage humanists to attempt to clarify to the nonacademic world the importance of the studies in which they believe and the values inherent in these studies.

The main activities of the committee have been a survey of humanistic research on the West Coast; the founding and support of the quarterly journal, *The Pacific Spectator*; the allocation of grants in aid



Hunting for fossils during a geology field trip, Antioch College; geology course is required of all students for their general education program

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Photograph Excised Here

Faculty of the University of Chicago meet in a seminar on the role of history and philosophy in the college program

Staff conference on personnel studies at the American Council of Learned Societies, Washington, D. C.



Photograph Excised Here

for regional study and research among West Coast scholars; and the organization of regional conferences, held in the spring of 1951, on Renaissance studies, Arthurian studies, nineteenth century studies, and history and the humanities. Another of the projects of the committee is a visiting writers program which encompasses eight institutions. Under this program one group is active in the Bay Region and the Southwest, another in the Northwest.

Toward general support of the Pacific Coast Committee for the Humanities, The Rockefeller Foundation in 1951 made a grant of \$6,000 to the American Council of Learned Societies, available over a period of three years.

HUMANITIES RESEARCH COUNCIL OF CANADA

Planning and Development

Following recommendations by the Royal Society of Canada and with the financial assistance of the Canadian Social Science Research Council, the Humanities Research Council of Canada was established in 1943. The constitution of this council provides for a membership of 16 scholars elected for limited terms, representing as many disciplines as possible. Committees on publication, research, graduate studies and doctoral dissertations carry out some of the council's general functions. The chairman of the Humanities Research Council of Canada is Mr. J. Roy Daniells, professor of English, University of British Columbia, Vancouver. Mr. John E. Robbins, secretary-treasurer, serves the Canadian Social Science Research Council in the same capacity.

Each year since 1948 the council has organized a regional conference at which its members meet with local humanists to discuss local problems in the humanities. Each meeting takes place in a different section of Canada. Current projects under the council's program deal with specific problems on an area basis. These studies include a comparative analysis of the cultural development of the English-speaking areas of the British Commonwealth and work on the growth of the French language and culture in North America, under the direction of Professor Maurice Lebel of Laval University. In addition, an examination of the relationships between the universities and the community in the humanistic disciplines was begun during 1951 and carried over into the following year. Results obtained through area studies under the council's program form the basis for a current inquiry into the planning of humanities courses at undergraduate and postgraduate levels. In 1951 The Rockefeller Foundation made a grant of \$19,200 toward continued support of the council's activities.

GRANTS IN AID

Eighty-eight separate projects in the humanities received grants in aid in 1951, which amounted to a total of \$295,970.12. A brief description of these projects is given below, under the main headings of the current program of the Division of Humanities.

LANGUAGE, LOGIC AND SYMBOLISM

EGYPT

Mohammed Farid abu-Hadid Bey; \$500 for a comparative study of literary Arabic and the colloquial Arabic of Cairo

GERMANY

Dr. F. Hepner (living in Heidelberg); \$1,400 for completion of his study on the history of communications

GREAT BRITAIN

University of Oxford, England, Somerville College; \$5,400 for work by Miss G. E. M. Anscombe on the philosophical writings of Ludwig Wittgenstein

JAPAN

Tokyo University; \$1,900 for a study of how Japanese language affects Japanese ways of thinking, under the direction of Professors Takeyoshi Kawashima, Hajime Nakamura and Shunsuke Tsurumi

UNITED STATES

Clark University, Worcester, Massachusetts; \$6,900 for experimental studies by Dr. Heinz Werner on language expression and comprehension

Vassar College, Poughkeepsie, New York; \$4,500 for a study of cultural factors in the use of language in the United States by Mrs. Dorothy Lee, associate professor of anthropology

William Penn Charter School, Philadelphia; \$650 for studies of linguistics and methods of teaching Latin by Dr. Waldo E. Sweet at the University of Michigan and elsewhere during the summer of 1951

INTERCULTURAL UNDERSTANDING

AUSTRIA

Austrian College Society, Vienna; 78,000 Austrian schillings, approximately \$3,200, for the Institute for Contemporary European Cultural Research

University of Vienna, Institute of Translation; \$1,000 for traveling expenses of representatives of the institute to the United States

CANADA

University of Montreal, Quebec; \$2,000 for visiting professor in American history from the United States

CHILE

University of Chile, Santiago; \$2,000 for acquisition of original publications or microfilms of philosophical works for the library of the Faculty of Philosophy

DENMARK

University of Copenhagen; \$6,000 for books and materials on American literature and civilization

FRANCE

Mr. Paul Mousset, French writer and journalist; \$2,500 for a visit to the United States and Canada for a study of ways in which American culture might come to be better understood in Europe

GERMANY

Professor Helmut Papajewski, University of Cologne; \$4,500 for a visit to educational institutions in the United States to study American literature and intellectual relations between Germany and America

University of Munich, Amerika Institut; 12,200 German marks, approximately \$3,100, for travel and other expenses of a seminar in American studies for German professors

GREAT BRITAIN

Dr. H. A. R. Gibb, professor of Arabic, University of Oxford, England; \$350 for a visit to Lebanon

University of Manchester, England; \$7,000 for books, journals and other materials for the Department of American Studies

INDIA

Dr. Suniti Kumar Chatterji, professor of Indian linguistics, University of Calcutta; \$800 for a trip to Mexico to gain a direct acquaintance with cultural and linguistic problems there for their relevance to similar problems in India

Dr. Asaf A. A. Fyzee, Public Service Commission, Bombay; \$2,400 for a visit to the United States and Canada for development of studies of Muslem law

IRAQ

Dr. Abdul Aziz el-Duri, dean, College of Science and Letters, Baghdad; \$2,700 for visits, principally to Great Britain, the United States and Turkey, to gain direct acquaintance with work in Near Eastern studies and college and university administration

ISRAEL

Hebrew University, Jerusalem; \$2,500 for books and materials for the School of Oriental Studies

Dr. Curt Wormann, librarian, Hebrew University, Jerusalem; \$1,800 for visits to libraries and library schools in the United States

LEBANON

American University of Beirut; \$700 for visits of Professor Nicolas A. Ziadeh to gain a firsthand acquaintance with Arab scholars in North Africa

MEXICO

Commission on History of the Pan American Institute of Geography and History, Mexico, D.F.; \$250 for the purchase and distribution in Latin America of 100 copies of *L'Oeuvre de la France en Amérique du Nord*

SWITZERLAND

Dr. Hans Curjel, University of Zurich; \$3,340 for a visit to the United States for comparative study of American and European cultural phenomena in the twentieth century

SYRIA

Syrian University, Damascus:

\$7,500 for books in the humanities, \$3,750 payable unconditionally, the balance payable on a dollar-for-dollar basis as matched by other funds

\$1,000 for Islamic studies in Great Britain by Dr. Adil Awwa

UNITED STATES

American Council of Learned Societies, New York; \$3,000 for investigation of the development of area studies in the British universities by Professor Irving A. Leonard, University of Michigan

Cornell University, Ithaca, New York; \$1,000 to enable Professor Morris E. Opler (sociology and anthropology) to elaborate his theory of cultural themes, with particular reference to India

Harvard University, Harvard-Yenching Institute, Cambridge, Massachusetts; \$1,000 for continuation of bibliographical survey of available materials on Chinese literature by Dr. James R. Hightower

Library of Congress, Washington, D. C.; \$2,350 for a visit to the United States by Mr. Joseph A. Dagher, conservateur of the National Library, Lebanon, to study collections of materials on the Near East in American libraries

Museum of Modern Art, New York:

For a study by Mr. George Amberg of the feasibility and cost of sending printed and audio-visual materials relevant to the drama to a number of Latin American centers; \$750

For purchase and shipment to centers in Latin America of publications, photographs, films, recordings or comparable material of use in development of work on drama; \$8,000

New School for Social Research, Institute of World Affairs, New York:

Study of the experience of successful immigrants in acquiring knowledge of American culture, by Mr. Paul Grabbe; \$10,000

For research into enduring core value systems by
Dr. Laura Thompson; \$8,925

Society for Japanese Studies, New York; \$3,000 for preparation by Mr. Allen Eaton of a book on the art of the Japanese in relocation camps

Stanford University, California; \$5,500 toward the development of literary exchange with writers and publishers in Asia, under the direction of Professor Wallace Stegner

University of Hawaii, Honolulu; \$2,400 for expenses of Dr. Earle Ernst, associate professor of drama and the theater, while studying Japanese drama in Japan

University of Michigan, Ann Arbor; \$500 for books and periodicals for the further development of a program of comparative literature at the University of Nagoya, Japan

University of North Carolina, Chapel Hill; \$5,000 for books, recordings and other material on drama and the theater for Waseda University, Japan, and other institutions in Asia

University of Washington, Seattle:

For purchase of a collection of books on Mongolia and Central Asia; \$3,205.40

For expenses in connection with the visit of Professor Marius B. Jansen to Japan and his research on China; \$9,882

ORIGINAL WORK IN PHILOSOPHY, HISTORY, RELIGION, LITERATURE AND DRAMA

GREAT BRITAIN

Mr. Asa Briggs, University of Oxford, England; \$2,100 for a visit to the United States to obtain a direct acquaintance with scholars and programs in the field of history

Royal Institute of International Affairs, London, England; \$8,000 for the visit of Professor and Mrs. Arnold J. Toynbee to the Institute for Advanced Study, Princeton, to study the significance of religion in history

INDIA

Dr. N. A. Nikam, Department of Philosophy, Majarani College, University of Mysore, Bangalore; \$400 for a trip to Europe to study present philosophical trends

MEXICO

Mexico City College; \$9,650 for a fellowship program for Mexican writers

PHILIPPINE ISLANDS

University of the Philippines, Manila; \$1,700 for expenses of two writers from Indonesia and one from Malaya in attending a writers' seminar in the Philippine Islands

UNITED STATES

Actors Company Creative Theatre, Inc., Chicago, Illinois; \$2,500 toward the expenses of a playwright in residence, Miss Ruth Herschberger

Claremont College, California; \$1,500 for the preparation of a general introduction to the Kegon School of Buddhist Philosophy by Dr. Daisetz T. Suzuki

Columbia University, New York; \$500 for a report and evaluation of the university seminar on religion and health

Dallas Civic Theatre, Texas; \$2,000 for aid to playwrights and other members of the staff on temporary duty

Howard University, Washington, D. C.; \$4,500 for completion of a book on the Negro in American culture by Professor Alain Locke

Karamu House, Cleveland, Ohio:

For expenses of a visit to the United States of Miss Ruth de Souza, connected with the Teatro Experimental do Negro, Rio de Janeiro; \$5,000

For expenses of a playwright in residence, Mr. Junius Eddy, and administrative expenses; \$5,000

Lehigh University, Bethlehem, Pennsylvania; \$1,000 for work in England by Professor Lawrence H. Gipson in connection with his study on "The British Empire Before the American Revolution"

Northwestern University, Evanston, Illinois; \$5,000 for continuation of studies of American culture in relation to the community by Professor Baker Brownell

Princeton University, New Jersey; \$250 for traveling and other expenses of members of a conference on the diplomacy of the Great Powers in the period 1919-1939

University of North Carolina, Chapel Hill; \$2,500 for a playwright in residence with the Carolina Playmakers, Mr. Kermit Hunter

University of Wisconsin, Madison; \$6,272.72 for playwrights in residence with the Wisconsin Idea Theatre, Miss Ruth Herschberger and Mr. Julius Landau

Washington and Lee University, Lexington, Virginia:

For work by Professor Edward D. Myers on the atlas and gazetteer for Professor Arnold Toynbee's *A Study of History*; \$1,500

For study of heroes of American culture by Dr. Marshall W. Fishwick; \$750

Yale University, New Haven, Connecticut; \$3,000 toward expense of preparing for publication *A World History for Americans* by Professor Ralph E. Turner and Dr. David A. Denker

CRITICISM

GREAT BRITAIN

University of Birmingham, England; \$3,000 for obtaining microfilms and other reproductions of materials needed by the Shakespeare Institute

JAPAN

Kyoto University; \$3,200 for studies in Chinese literature by Professor Kojiro Yoshikawa

TURKEY

University of Ankara; \$2,500 for a representative collection of books in English and in French on literary criticism for the Faculty of Letters

UNITED STATES

Mrs. Dorothy B. Jones, Los Angeles, California; \$545 for a study of selected classic films

Princeton University, New Jersey; \$3,500 for a comprehensive evaluation by Mr. Robert Fitzgerald of the outcomes of the Princeton Seminars in Literary Criticism

University of Chicago, Illinois; \$6,500 for a study of response to narrative art by Simon O. Lesser

University of Oklahoma, Norman; \$9,500 for preparation for publication of critical appraisals of world literature over the past 25 years in its journal, *Books Abroad*

GENERAL EDUCATION IN THE HUMANITIES

COSTA RICA

National Museum of Costa Rica, San José; \$8,500 for the preparation of an exhibition of living history

GERMANY

Association of the West German Radio Stations; \$8,000 for a visit to Germany by Mr. Charles Siepman of New York University and Mr. Clark Foreman, Bureau of Applied Social Research, Columbia University, to make a survey of the possibilities of improving operations of radio stations and radio programs

Dr. Friedrich Schneider, chief administrator, University of Cologne; \$2,100 for a visit to study organization and administration of American universities

INDIA

Kalakshetra (a center for the study of Indian arts in Madras); \$2,450 toward the purchase of equipment for recording Indian dance music

KOREA

National Museums of Korea; \$2,400 for the work of Dr. Kim Chewon, director general

SWEDEN

Professor Erik Lönnroth, University of Uppsala; \$450 for visits, after completion of his term as visiting professor at Princeton University, to observe organization and scholarship of some American universities

TURKEY

Mr. Kadri Yorukoglu, president of the Council of Education, Ministry of Education:

\$3,000 for a visit to the United States and Canada to study educational developments

\$1,000 for the purchase of books and other materials in the United States and Canada, for the library of the ministry

UNITED STATES

Boston University, Massachusetts; \$2,750 for study of problems connected with general education in American academic institutions, by Mr. Simon Williams

Mr. Robert Darrell; \$750 for a study of the present condition, maintenance and utilization of music records in selected American educational institutions.

Foundation for Integrated Education, Inc., New York; \$2,100 for a summer workshop at Durham, New Hampshire, in August 1951

Harvard University, Graduate School of Education, Cambridge, Massachusetts; \$5,500 for expenses of preparation of a manuscript on comparative education by Professor Robert Ulich

University of Illinois, Urbana; \$9,150 for a study of the possibilities of training personnel for popular writing on the humanities, under the direction of Dr. Wilbur Schramm, dean of the Division of Communications

Mrs. Helen Wessells; \$2,150 for a preliminary survey of the volume and character of American exports of publications, commercial and noncommercial

MISCELLANEOUS

HAITI

Miss Luce Turnier, Port-au-Prince; \$300 for artists' materials essential for her studies in painting in France as a fellow of the French government

UNITED STATES

American Council of Learned Societies, New York; \$2,000 for a visit to Great Britain by the executive director, to obtain information concerning the effect of present legislation on the development of the humanities in Great Britain

American Council on Education, Washington, D. C.; \$7,500 for a general study of the Latin American countries with particular reference to work in the humanities, by Mr. Herschel Brickell

Society of Biblical Literature and Exegesis, Chicago, Illinois; \$1,600 for expenses of foreign travel and meetings connected with the organization of the International Executive Committee of the International New Testament Manuscripts Project

For small grants for travel, equipment, materials, consumable supplies, research and miscellaneous expenses for the work of individuals; \$2,000 for allocation by the Director of the Division

OTHER APPROPRIATIONS

OTHER APPROPRIATIONS

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OTHER APPROPRIATIONS

GRANTS which fall somewhat outside the specific divisional programs or include elements relating to more than one aspect of the Foundation's work are taken from general funds. In 1951 seven appropriations and nine grants in aid were of this character.

INTERNATIONAL PRESS INSTITUTE

The International Press Institute was formally established on May 16, 1951 at the meeting of an organizing committee in Paris. This committee had been chosen by an international group of editors who met in New York in the fall of 1950. The chief objective of the institute is to increase international understanding through the promotion of cooperation among editors and the development of a free press throughout the world. The institute undertakes research projects on problems of international interest relating to the press and also serves as a clearing house of information. The Foundation contributed \$120,000, to be available during the period ending December 31, 1954, for the expenses of the institute.

The secretariat, headed by the director of the institute, Mr. E. J. B. Rose of the London *Sunday Observer*, has offices in Zurich, Switzerland, administrative and research center of the institute. An executive

board of 15 members, with Mr. Lester Markel of the *New York Times* as chairman, has supervision of the affairs of the institute.

The membership is composed of representatives of newspaper staffs who have a responsibility for the editorial and news policies of their newspapers, and whose newspapers are devoted to the principles of freedom of the press. Since the establishment of the institute, 24 national committees have been formed. Members are recruited for the institute through the national committees. A general assembly of the entire membership is to be held annually, each year in a different country.

SALZBURG SEMINAR IN AMERICAN STUDIES, INC.

In 1951 the Foundation gave \$100,000 to the Salzburg Seminar in American Studies, Inc., held at Castle Leopoldskron about a mile outside Salzburg, Austria, toward its general expenses during the three years beginning June 1, 1951. Grants totaling \$78,000 were made in 1948, 1949 and 1950 for the seminar through the World Student Service Fund before the seminar was organized as a business entity.

The seminar was initiated in the summer of 1947 by a few interested Americans, chiefly from Harvard University. In 1950 a series of four-week winter sessions was introduced. The six-week summer session of 1951 covered philosophy and religion, American history and institutions, American government, industrial relations, poetry and literature, psychology and economics. The courses were presented by ten faculty members from universities and colleges in the

United States. About 100 European students from countries outside the Iron Curtain attended the session. During the period January 3 to July 3 there were five four-week sessions, all on separate subjects. Each of these sessions was attended by about 45 students from a dozen countries. The seminar students are mature and carefully selected; among them have been college professors and graduate students, radio script writers, journalists, lawyers, government officials, sociologists, economists and teachers.

The promotion of free discussion is perhaps one of the seminar's most useful by-products. The association of the students and teachers together at Castle Leopoldskron affords an opportunity for establishing informal contacts outside the classroom between the American instructors and the European students, as well as among the European students themselves.

AMERICAN LIBRARY ASSOCIATION

International Youth Library, Munich

The Foundation appropriated \$35,000 to the American Library Association, Chicago, for dollar expenses of the International Youth Library, Munich, Germany, during a period of three years ending June 30, 1954. This grant continues aid which was provided in 1949 to help establish the library, under the Foundation's postwar European Rehabilitation Program. Contributions from German sources amount to roughly two-thirds of the total expenditures, and the state of Bavaria has provided a building for the library.

The library serves children and young people from the ages of six to twenty. It was established as a result of the success of a circulating international book exhibition started under the auspices of the Information Control Division of the Office of Military Government of the United States soon after the termination of the war. The library was organized by Mrs. Jella Lepman, who developed the project and is now its director. Books are obtained from many countries, and the interest of the children and young people is aroused and held by language instruction, storytelling hours, international films and records, puppet shows, children's drama and radio discussion groups.

The American Library Association acts as American sponsor for the Youth Library and has supplied technical counsel for its program.

AMERICAN COUNCIL ON EDUCATION

Committee on Religion and Education

The Committee on Religion and Education of the American Council on Education is supervising an exploratory study of the relation of religion to general education, including a study of projects now in operation designed to enrich the school program in respect to moral and spiritual values. The Foundation provided \$31,616 to finance the study for the year beginning July 1, 1951, the approximate period considered necessary for making the study and completing a report.

The study is being conducted for the council by Dr. Clarence Linton, on leave from Columbia University. On the Committee on Religion and Education

are Mr. F. Ernest Johnson, professor emeritus of Teachers College, Columbia University, chairman; Rabbi Louis Finkelstein, president, Jewish Theological Seminary of America; the Reverend Frederick G. Hochwalt, secretary general, National Catholic Educational Association; Mr. John W. Nason, president, Swarthmore College; and a number of other representatives of public and private education.

The purpose of this exploratory study is to gather information from which issues may be formulated and recommendations made for possible further activities in this field by the American Council on Education or other agencies.

INSTITUTE OF INTERNATIONAL EDUCATION

The sum of \$50,000 has been given to the Institute of International Education, New York, to assist its program of international exchange of students and related services during a two-year period ending June 30, 1953.

The Institute of International Education arranges exchanges of students, scholars and specialists between the United States and foreign countries. Since the close of World War II it has administered foreign student programs of the United States government, including student awards under the Fulbright program. It also handles fellowship awards under the United Nations Educational, Scientific and Cultural Organization and privately sponsored fellowships such as those of Atlantique, for the exchange of social work trainees between France and the United States; the Seagram international fellowships, for training in

industrial chemistry; and awards of the Belgian Institute for the Encouragement of Scientific Research in Industry and Chemistry. In connection with its program the institute also operates an information and counseling service.

OFFICE OF THE UNITED NATIONS HIGH COMMISSIONER FOR REFUGEES

The sum of \$100,000 was made available in April 1951 to the Office of the United Nations High Commissioner for Refugees, Geneva, for a survey of the extent of the refugee problem and the most appropriate methods for its solution.

The High Commissioner, Dr. D. J. van Heuven Goedhart, appointed Mr. Jacques Vernant, secretary general of the Centre d'Études de Politique Étrangère, Paris, to head the survey. Mr. Vernant and his co-workers made a preliminary survey in 1951, a report of which was submitted to the High Commissioner early in 1952. The refugee problem was studied in Trieste and the following 16 countries: the United Kingdom, Norway, Sweden, Denmark, Netherlands, Belgium, France, Federal Republic of Germany, Switzerland, Austria, Italy, Yugoslavia, Greece, Egypt, Syria and Lebanon.

GÉNÉRAL EDUCATION BOARD

In 1946 when the General Education Board was approaching the end of its resources, the Trustees of the General Education Board and of The Rockefeller Foundation considered the question of additional funds to enable the Board to continue certain

phases of its work for which there was still a need, especially in the southern states. As a result, in 1946, 1947 and 1948, a total of \$10,500,000 was provided by the Foundation for the work of the General Education Board through 1953.

The Board is devoting its attention chiefly to the development of graduate education in the South through aid to a few strong centers, the improvement of undergraduate instruction in Negro colleges and acceleration of educational advance in several states where resources for educational purposes are limited. As the funds which the Foundation had already given the General Education Board were not sufficient to cover estimated needs for projects which appear to be of special value during the next two years, additional grants totaling approximately \$5,000,000 were made in 1951, to be available through 1953. These grants consisted of securities amounting to \$3,001,625 and a fund of \$2,000,000.

GRANTS IN AID

World Student Service Fund, New York; \$6,500 for expenses of five student representatives from the United States to a seminar for German, European and American students held at Frankfurt, Germany, in the summer of 1951, promoted by the National Student Association of the United States

Austro-American Institute of Education, Vienna, Austria; \$7,000 for administrative expenses of the institute's work in promoting student and cultural exchange between the United States and Austria, over a three-year period

Mr. and Mrs. Olav Brennhovd, Fridtjof Nansen Haus, Göttingen, Germany; \$4,500 to cover expenses of a trip to the United States for study and observation relating to the purposes of Nansen Haus, an international student house in Göttingen

National Travelers Aid Association, New York; \$3,800 to cover expenses of delegate to international conference of travelers aid societies at Canberra, Australia, in May 1951

Woodrow Wilson School of Public and International Affairs, Princeton University, New Jersey; \$10,000 for a pilot study of student exchange under the Department of State, with particular reference to Belgium, for the purpose of evaluating the effectiveness of the student exchange programs

Japanese-United States cultural relations; \$8,700 for the expenses of an exploratory study of Japanese-United States cultural relations, with particular reference to the development of a cultural center and student international houses in Japan

Columbia University, New York; \$500 toward the cost of a history of the National Science Foundation, sponsored by the university's seminar on "The Theory and Practice of Organization and Management"

University of Buffalo, New York; \$2,150 for a conference on general education of college grade, under the direction of Earl J. McGrath, United States Commissioner of Education, at the Princeton Inn, December 1951

University of Illinois, Urbana; \$3,000 toward the expenses of a meeting called by the president of the university, George D. Stoddard, at Princeton in December 1951, to consider the possibility of a broad restatement of American political philosophy

FELLOWSHIPS

FELLOWSHIPS

THE Foundation's fellowship appointments are closely integrated with the work of its several divisional programs. Qualified applicants are persons who have completed training in their fields of specialization, have had several years of experience in research or teaching, and give promise of assuming positions of leadership in their specialties in their native countries. The fellow is proposed by his superior in the institution in which he works and is usually assured of a position in that institution on his return from his period of fellowship. The purpose of the fellowship is not primarily to benefit a particular individual, but rather to stimulate and advance research and teaching in the medical and natural sciences, the social sciences and the humanities in the institution and country from which the fellow is appointed.

In most instances a Foundation fellowship is granted for a period of one year, but in some special cases it may be extended for a longer period or renewed for a second year.

During 1951, 375 persons from 49 different countries held Foundation fellowships at some time during the year. The following table indicates their distribution by divisions:

	Number of fellows 1951	Awards made in 1951	Awards made previously and continued into 1951
Medicine and Public			
Health.....	193	97	96
Natural Sciences.....	82	51	31
Social Sciences.....	51	33	18
Humanities.....	49	33	16
	<u>375</u>	<u>214</u>	<u>161</u>

The 193 fellowships in medicine and public health included about 100 in public health subjects. The fellowships in the natural sciences were predominantly in the general field of experimental biology, but about 12 per cent were in the developing field of agriculture. Fellowships in the social sciences were in the fields of economics, including economic history and economic geography, international relations, sociology, social psychology, cultural anthropology and political science. Fellowships in the humanities were chiefly in philosophy, history, drama, linguistics and area studies, including such aspects as the history, culture, philosophy and language of specific world areas.

Of the fellows in medicine and public health, 126 came from other countries to study in the United States, and 8 studied in both the United States and elsewhere. Other foreign fellows in these fields studied in Canada (17), England (5), France (4), Scotland (1),

Sweden (4), both Switzerland and England (1); 3 South American fellows studied in Chile and 2 Peruvians studied in their own country. Twenty-one United States fellows remained here for their studies, and one went to Canada. Of the fellows in the natural sciences, 66 came to the United States from other countries, one Brazilian went to Italy and another studied animal breeding in the United States, Mexico and Costa Rica; a Chilean went to England and a Colombian studied plant pathology in Mexico; one Italian went to the Nobel Institute in Sweden and another to the University of Brussels in Belgium; a Norwegian studied in Denmark; a Yugoslavian studied in England and another in France; and of 7 fellows from the United States, 2 studied in Sweden, 1 worked in both England and Denmark, 1 carried out a survey in several European countries, 1 studied in France, and 2 remained in the United States for their studies. Of fellows in the social sciences, 41 studied in the United States, 7 in England, 1 in France, and 2 in both the United States and other countries. In the humanities, 25 fellows studied in the United States; 5 studied in both the United States and in one or more other countries; 2 conducted area studies in three different South American countries; 1 conducted such studies in Lebanon, Iraq and Syria and 1 in Iran and Lebanon; 5 studied in France, 2 in Canada, 2 in Mexico, and 6 others in England, Italy, Turkey, Egypt, Siam and Hawaii, respectively.

Funds made available for the year 1951 for fellowships administered by the Foundation were

\$1,010,000 for all divisions, and total expenditures amounted to \$813,450. Grants made in 1951 for fellowships for the year 1952 totaled \$1,110,000 for the four divisions.

Besides awards which the Foundation administered itself, six national councils or agencies administered 242 fellowships awarded from funds given by the Foundation in 1951 or previous years. The agencies and number of fellows were as follows:

National Research Council	52
Medical Sciences	20
Welch Fellows	4
Natural Sciences	28
British Medical Research Council	14
Social Science Research Council	65
Canadian Social Science Research Council	26
American Council of Learned Societies	61
National Theatre Conference	24
	—
	242

The Welch fellowships administered by the National Research Council were established by the Foundation in 1941 to provide an adequate stipend and laboratory expenses for periods of three to six years for mature investigators intending to devote themselves to an academic career in medicine.

Grants made in 1951 to other agencies for fellowships were: to the National Research Council for fellowships in the medical sciences, \$125,000, and for fellowships in the natural sciences, \$150,000; to the Social Science Research Council for fellowships, \$220,000; and to the Australian-New Zealand Social Science Fellowship Committee, for administrative expenses, \$1,000.

A directory giving the names of the fellows appointed by the Foundation since the beginning of the fellowship program through the year 1950 was published in 1951. This directory gives the country and name of the institution from which the fellow was appointed, the major field, place of fellowship study and latest address of some 5,000 individuals. The total number of fellowship appointments administered by the Foundation was 6,342. The amount expended for this purpose from 1917 through 1950 was roughly \$19,000,000.

REPORT OF THE TREASURER

TREASURER'S REPORT

IN the following pages is submitted a report of the financial transactions of The Rockefeller Foundation for the year ended December 31, 1951.

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Schedule of Securities on December 31, 1951	522-526

BALANCE SHEET — DECEMBER 31, 1951

ASSETS

SECURITIES (Ledger value).....		\$163,654,758.11
(Market value \$347,245,448.62)		
CURRENT ASSETS		
Cash on deposit.....		6,534,488.35
Advances and deferred charges.....	\$377,688.18	
Sundry accounts receivable.....	140,696.67	518,384.85
		<hr/>
EQUIPMENT		
In New York.....		72,982.08
		<hr/>
		<u>\$170,780,613.39</u>

TREASURER'S REPORT

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BALANCE SHEET — DECEMBER 31, 1951

FUNDS AND OBLIGATIONS

PRINCIPAL FUND.....		\$131,491,910.86
COMMITMENTS		
Unpaid appropriations.....	\$29,429,228.78	
Unappropriated authorizations.....	1,489,106.00	30,918,334.78
	<hr/>	
FUNDS AVAILABLE FOR COMMITMENT		
Appropriations Account No. 1.....	\$2,031,970.73	
Appropriations Account No. 2.....	5,971,524.14	8,003,494.87
	<hr/>	
CURRENT LIABILITIES		
Accounts payable.....		293,890.80
EQUIPMENT FUND.....		72,982.08
		<hr/>
		\$170,780,613.39
		<hr/> <hr/>

PRINCIPAL FUND

Balance, December 31, 1950.....		\$118,735,747.26
Add		
Amount by which the proceeds of securities sold during the year exceeded their ledger value...	\$10,209,255.93	
Excess of quoted market value over cost of securities donated to the General Education Board.	2,534,907.67	
Anonymous gift received.....	12,000.00	12,756,163.60
Balance, December 31, 1951.....		\$131,491,910.86

APPROPRIATIONS AND PAYMENTS

Unpaid appropriations, December 31, 1950.....		\$26,385,556.48
Appropriations during the year 1951 (For detail see pages 458 to 512)		
Medicine and Public Health.....	\$3,796,270.00	
Natural Sciences and Agriculture.....	3,680,208.00	
Social Sciences.....	4,586,895.00	
Humanities.....	1,658,072.00	
General Education Board.....	5,001,625.00	
Miscellaneous.....	680,526.00	
Administration:		
Scientific Services.....	1,108,290.54	
General.....	646,993.46	
	\$21,158,880.00	
Unused balances of appropriations allowed to lapse.....	1,236,739.24	19,922,140.76
		\$46,307,697.24

Payments on 1951 and prior years' appropriations (For details see pages 458 to 512):		
Medicine and Public Health.	\$3,416,814 79	
Natural Sciences and Agriculture	1,987,808.42	
Social Sciences	3,567,243.01	
Humanities.	1,206,485.70	
General Education Board.	4,501,625.00	
Miscellaneous.	687,140 84	
Administration:		
Scientific Services	1,023,345 83	
General.	488,004.87	\$16,878,468.46
		<hr/>
Unpaid appropriations, December 31, 1951.		\$29,429,228 78
		<hr/> <hr/>

EQUIPMENT FUND

	BALANCE	CHANGES DURING 1951		BALANCE
	Dec. 31, 1950	ADDITIONS	DEPRECIATION	Dec. 31, 1951
Library.	\$8,939.00	\$1,106.13	\$330 13	\$9,735.00
Equipment.	62,337.78	5,091.10	4,181.80	63,247.08
	<hr/>	<hr/>	<hr/>	<hr/>
	\$71,296 78	\$6,197.23	\$4,511.93	\$72,982.08
	<hr/> <hr/>	<hr/> <hr/>	<hr/> <hr/>	<hr/> <hr/>

FUNDS AVAILABLE FOR COMMITMENT

APPROPRIATIONS ACCOUNT No. 1

Funds available for commitment, December 31, 1950.....				\$4,801,980.58
Add				
Income and refunds received during 1951				
Income from securities.....	\$16,972,414.47			
Refunds.....	72,113.74			
Gift received for general purposes.....	500.00			
Lapsed				
Appropriations.....	\$1,106,848.94			
Unappropriated authorizations.....	236,993.00	1,343,841.94	18,388,870.15	
				<u>\$23,190,850.73</u>
Deduct				
Appropriations from this account during 1951.....				<u>\$21,158,880.00</u>
Funds available for commitment, December 31, 1951.....				<u>\$2,031,970.73</u>

APPROPRIATIONS ACCOUNT No. 2

Funds available for commitment, December 31, 1950.....				\$5,841,633.84
Add				
Unused balances of appropriations allowed to lapse.....				129,890.30
Funds available for commitment, December 31, 1951.....				<u>\$5,971,524.14</u>

APPROPRIATIONS AND UNAPPROPRIATED AUTHORIZATIONS

Commitments, December 31, 1950		
Unpaid appropriations	\$26,385,556 48	
Unappropriated authorizations	1,726,099.00	\$28,111,655 48
<hr/>		
Add		
Amount appropriated during 1951	\$21,158,880.00	
Less		
Appropriations lapsed during 1951	1,236,739.24	
<hr/>		
Authorizations lapsed during 1951	\$19,922,140 76	
	236,993 00	19,685,147 76
<hr/>		
		\$47,796,803 24
Deduct		
Payments on 1951 and prior years' appropriations		\$16,878,468 46
<hr/>		
Commitments, December 31, 1951		
Unpaid appropriations	\$29,429,228.78	
Unappropriated authorizations	1,489,106 00	\$30,918,334.78
<hr/>		

TREASURER'S REPORT

APPROPRIATIONS DURING 1951, UNPAID BALANCES OF PRIOR YEAR APPROPRIATIONS
AND PAYMENTS THEREON IN 1951

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THE ROCKEFELLER FOUNDATION

	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
MEDICINE AND PUBLIC HEALTH			
<i>Investigation and Control of Specific Diseases and Deficiencies</i>			
Malaria			
Caribbean Area			
Tobago. 1949-1952 (IH 49023, GA 5011, 51117).....	\$14,279.18	\$.....	\$4,893.79
Europe			
Italy			
Field laboratory for study of insecticides in Latina. 1951 (GA 5022) .	6,680.00	.....	2,522.37
Sardinia Anopheles Eradication Program. 1949-1952 (IH 48038, 50002, 50126).....	59,264.89	.....	37,188.33
Sardinia Public Health Program. 1951-1952 (GA 5167, 5198).....	5,170.00	.....	3,837.84
University of Pavia			
Research on cytogenetics of anopheline mosquitoes. 1949-1951 (IH 49003, GA 5010).....	7,649.36	.....	5,092.20
Far East			
India			
Mysore studies and control demonstration. 1949-1952 (IH 49027, 50130, GA 51118).....	27,364.51	.....	15,439.47
Pakistan			
Malaria institute and laboratory. 1949-1950 (IH 49004).....	119.49	.....	Cr. 101.91
Mexico			
Investigations in Veracruz. 1949-1950 (IH 48022, 49018).....	712.52	.....	347.25
Studies on control of insect vectors with DDT. 1948-1952 (IH 49019, 50169, GA 5005, 5189, 51131).....	19,341.17	.....	13,386.70

South America			
Brazil. Equipment for research. 1950-1951 (GA 5009)	\$2,000.00	\$	\$43.19
Colombia. 1948 (IH 47035)	3,692.26	. . . . .	625.02
Peru. 1948-1950 (IH 47036)	5,246.97	. . . . .	2,228.99
Venezuela. 1948-1950 (IH 47060, GA 5002, 5018)	2,967.68	. . . . .	2,224.22
Nutrition			
Far East			
India			
Mysore anemia studies. 1949-1952 (IH 49009, 51114, GA 5016)	14,037.81	. . . . .	7,492.46
United States			
Vanderbilt University, Nashville, Tennessee			
School of Medicine. 1949-1952 (IH 49016)	6,408.83	. . . . .	6,000.00
Tuberculosis			
United States			
Tennessee. 1948-1953 (IH 49014, 50168, RF 51185)	15,735.26	17,160.00	14,721.07
Typhus Fever			
United States			
Florida. 1949-1950 (IH 49012)	4,630.27	. . . . .	Cr. 2,112.39
Virus Diseases			
Central Laboratory in New York			
Maintenance. 1950-1952 (IH 49028, 50124, RF 51043, 51199)	166,011.13	155,088.00	149,071.98
Field Laboratories			
India, Poona. 1951-1952 (GA 5151, 51106, RF 51199)	20,000.00	75,000.00	7,898.48
Africa, South America, elsewhere. 1952 (RF 51199)	125,000.00
Yellow Fever			
Africa			
Central and East Africa. 1948-1949 (IH 48016)	1,711.30

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	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
<i>MEDICINE AND PUBLIC HEALTH — Continued</i>			
<i>Investigation and Control of Specific Diseases and Deficiencies — Continued</i>			
<i>Yellow Fever — Continued</i>			
<i>Africa — Continued</i>			
West Africa. 1947-1949 (IH 46048, 47042, 48017).....	\$24,851 92	\$	\$15,919.75
South America			
Colombia			
Control and investigation. 1947-1948 (IH 47039).....	2,449 01	. . .	1,898 01
Laboratory construction and equipment. 1945-1948 (IH 44058)...	462 95	. . . . .	. . . . .
United States			
Book: <i>Yellow Fever</i> . 1950-1954 (GA 5001, RF 51098)	9,778 00	3,000 00	6,737.69
<i>Other Studies</i>			
Investigation of disease closely resembling poliomyelitis			
Europe			
Iceland. 1949-1950 (IH 49040, 49041)	3,976.00	. . . . .	. . . . .
Rodent ecology and control			
United States			
Johns Hopkins University, Baltimore, Maryland			
School of Hygiene and Public Health. 1950-1951 (IH 49013)...	9,000 00	. . . . .	8,969.25
Taxonomic center and insectary			
United States			
Johns Hopkins University, Baltimore, Maryland			
Department of Parasitology. 1948-52 (IH 47044).....	462 44	. . . . .	444 78
<i>Development of the Health Sciences</i>			
United States			
American Psychiatric Association, New York			
Work of Committee on Psychiatric Nursing (RF 47107).....	1,250 00	. . . . .	1,250.00

Child Research Council of Denver, Colorado			
Studies in child growth and development (RF 48057, 49116, 50068, 51154).....	\$112,500.00	\$25,000.00	\$24,952.18
Columbia University, New York City			
Research in brain chemistry (RF 50010).....	8,000.00	.....	4,000.00
Study of the effects of fetal and neonatal injury on growth and functional development (RF 47051).....	16,864.15	.....	8,067.05
Duke University, Durham, North Carolina			
Work in parapsychology (RF 50052).....	25,000.00	.....	10,000.00
Georgia State College for Women, Milledgeville			
Research in medical genetics (RF 47055).....	2,000.00	.....	2,000.00
Harvard University, Cambridge, Massachusetts			
Research on physiological aspects of the development of behavior patterns at the Laboratory of Social Relations (RF 51179).....	.....	75,000.00	.....
Investigation of the dynamics of personality development (RF 48016)	27,000.00	.....	17,718.78
Research in epilepsy at Harvard Medical School and Boston City Hospital (RF 49035).....	15,000.00	.....	15,000.00
Teaching and research in psychiatry at the Harvard Medical School (RF 48055).....	37,746.62	.....	6,240.00
Study of adult development by Department of Hygiene (RF 50097) ..	11,250.00	.....	6,250.00
Institute of the Pennsylvania Hospital, Philadelphia			
Research in neurophysiology (RF 48044).....	1,354.97	.....	1,000.00
Massachusetts General Hospital, Boston			
Research in endocrinology and metabolism (RF 49107).....	8,000.00	.....	2,948.26
Massachusetts Institute of Technology, Cambridge			
Project in mathematical biology conducted jointly with the National Institute of Cardiology, Mexico, D.F. (RF 47009).....	4,127.43	.....	1,372.73
Menninger Foundation, Topeka, Kansas			
Establishment of a school for psychiatric aides in conjunction with the Topeka State Hospital (RF 49093).....	35,174.56	.....	35,174.56

	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
MEDICINE AND PUBLIC HEALTH — Continued			
<i>Development of the Health Sciences — Continued</i>			
United States — Continued			
National Association for Mental Health, New York			
General support (RF 51113)	\$	\$100,000.00	\$50,000.00
National Health Council, Inc., New York			
Program in the coordination of voluntary health agencies (RF 48009)	52,769.41	.....	52,769.41
National Research Council, Washington, D. C.			
Committee for Research in Problems of Sex (RF 49074, 51063)	120,500.00	160,000.00	77,629.71
New England Medical Center, Boston, Massachusetts			
Research in endocrinology (RF 50076)	30,000.00	.....	.....
New York City Department of Health			
Statistical Service, 1945-1950 (IH 44014)	1,352.19	.....	1,200.00
New York University, New York			
Interdepartmental project on the rehabilitation of neurological patients (RF 49075, 51169)	18,600.00	85,320.00	17,429.93
Princeton University, New Jersey			
Work of the Department of Psychology (RF 51022) . . . . .	.....	25,000.00	25,000.00
Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Maine			
Studies of genetic factors of intelligence and emotional variation in mammals (RF 50005, 51019)	100,000.00	50,000.00	50,000.00
Stanford University, Palo Alto, California			
Follow-up study on a group of gifted individuals (RF 50025)	5,500.00	.....	5,500.00
Tufts College Medical School, Boston, Massachusetts			
Research in brain chemistry (RF 44098)	485.03	.....	.....
University of California, Berkeley			
Establishment of an Institute for Personality Assessment and Research (RF 49048)	46,492.64	20,000.00

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University of Chicago, Illinois			
Teaching and research in psychiatry (RF 47050)	\$20,000 00	\$	\$10,000 00
Investigation of nondirective psychotherapy (RF 49090, 51081)	13	127,000 00	23,000 00
University of Cincinnati, Ohio			
Teaching and research in psychiatry (RF 47121)	122,500 00	.....	33,636 30
University of Illinois, Urbana			
Research in brain chemistry (RF 51090) . . . . .	. . . . .	24,000 00	4,000 00
University of Minnesota, Minneapolis			
Research in human genetics at the Dight Institute for Human Genetics (RF 51016) . . . . .	. . . . .	27,300 00	4,550 00
University of Oregon, Eugene			
Work in neurophysiology (RF 48071)	6,000 00	.....	3,000 00
University of Oregon Medical School, Portland			
Clinical and physiological investigation of pain (RF 49051)	5,317 52	. . . . .	5,317 52
For work in constitutional medicine (RF 51004) . . . . .	. . . . .	100,000.00	15,000 00
Washington University, St. Louis, Missouri. School of Medicine			
Support of Department of Neuropsychiatry (RF 47041)	20,249 91	....	10,000.00
Western Reserve University, Cleveland, Ohio			
Research in psychiatry, especially in biochemistry related to mental disease (RF 48056)	35,000 00	. . . . .	13,751 15
Yerkes Laboratories of Primate Biology, Orange Park, Florida			
Building and general budget (RF 47019, 50073, 51121)	157,500 00	40,000 00	57,493 96
Canada			
British Columbia. Local health work. 1936 52 (III 36021, 38024)			
	14,943.80	. . . . .	.. . . .
Dalhousie University, Halifax, Nova Scotia			
Development of teaching in psychiatry (RF 47069)	4,554 81	. . . . .	2,821 77
Joint study by the Department of Obstetrics and Gynecology and by the Department of Psychiatry of psychological factors in pregnancy and childbirth (RF 51007)	22,500 00	1,750.00

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	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
MEDICINE AND PUBLIC HEALTH — Continued			
<i>Development of the Health Sciences — Continued</i>			
<i>Canada — Continued</i>			
McGill University, Montreal			
Maintenance of Department of Psychiatry (RF 49033)	\$63,015.85	\$.....	\$17,625.00
Research in brain chemistry (RF 46069)	9,208.58	.....	4,731.25
Research in endocrinology (RF 46070)	3,711.50	.....	906.30
Research on the physiological basis of behavior (RF 51172) .....	.....	30,000.00	3,840.00
New Brunswick. Division of Sanitary Engineering. 1947-48 to 1950-51 (IH 46033)	1,583.45	.....	.....
Prince Edward Island. Provincial Laboratory. 1946-47 to 1950-51 (IH 38035)	2,618.85	.....	906.30
University of Toronto			
Development of a laboratory of experimental clinical neurology (RF 49049)	21,123.44	.....	4,819.97
Mexico			
Local health work. 1944-1950 (IH 43052)	10,697.27	.....	1,012.76
National Institute of Cardiology, Mexico, D.F.			
Research in neurophysiology and pharmacology (RF 49036)	23,041.68	.....	4,717.19
Office of Special Sanitary Service (Cooperative Central Office). 1948-1951 (IH 48028, 49017, GA 5013)	6,813.36	.....	4,013.80
Training center and demonstration health unit. 1948-1950 (IH 48011, 49020)	521.94	.....	183.32
Caribbean Area			
Dominican Republic			
Endemic Disease Control Service. 1949-52 (IH 48019, 49022, GA 5023, 51100)	15,334.80	.....	7,197.51
South America			
Argentina			
Institute of Biology and Experimental Medicine, Buenos Aires. Support of research (RF 47067)	4,085.17	.....	3,749.03

Bolivia			
Division of Rural Endemic Diseases. 1948-1952 (IH 47049, GA 5197).	829,920 54	\$	812,394 49
Chile			
Local health work. 1948-1952 (IH 48015, 49024, RF 51217, GA 5111).	24,588 82	20,250 00	15,160 72
National Department of Sanitary Engineering. 1950-1953 (IH 49030, 50128, RF 51184).	27,270 10	22,500 00	19,326 95
Tuberculosis Survey. 1945-1950 (IH 45009).	26,124 53		467 22
Peru			
Division of Development of Program of Ministry of Health. 1945-1953 (IH 44015, 45056, 47024, 47025, 47026, 47027, 48036, 50170)	154,200 17		50,444 83
Institute of Andean Biology, University of San Marcos, Lima			
Equipment for a high altitude laboratory at Morococha (RF 49061)	2,799 72		2,642 47
Europe			
Belgium			
University of Brussels			
Research in neurophysiology (RF 46015, 50088)	27,470 76		3,315 40
University of Liège			
Development of the Laboratory of Neuroanatomy (RF 50143)	20,800.00		8,961 67
Denmark			
National Health Department. 1950-1952 (IH 49031)	11,587 50		7,265.00
University of Aarhus			
Development of research and teaching in psychiatry (RF 49004)	15,876.01		3,991 07
University of Copenhagen			
Establishment of a Child Guidance Clinic (RF 50009)	44,588 72		15,687 01
Work in the genetics of mental defectiveness (RF 48112)	12,914 91		2,791 01
Iceland			
Local health work. 1950-51 through 1953 (IH 49025)	29,370 00		7,675 29
France			
Collège de France, Paris			
Equipment for an experimental monkey station in Algeria (RF 49001)	13,699 83		7,754 71
Survey of Soissons Area, 1951-1952 (GA 5017)	7,200 00		3,735.63

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	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
<i>MEDICINE AND PUBLIC HEALTH — Continued</i>			
<i>Development of the Health Sciences — Continued</i>			
<i>Europe — Continued</i>			
<i>Germany</i>			
University of Heidelberg			
Establishment of an Institute of Psychosomatic Medicine (RF 50001)	\$39,445.94	\$.....	\$.....
<i>Great Britain</i>			
Burden Neurological Institute, Bristol, England			
Research in neurophysiology and neurosurgery (RF 47088).....	19,955.46	.....	7,003.12
Cardiff City Mental Hospital, Wales			
Research in normal and pathological biochemistry of brain tissue (RF 48014).....	16,979.67	.....	5,036.63
Medical Research Council, London, England			
Purchase of scientific equipment (RF 51182).....	.....	38,000.00	.....
Tavistock Institute of Human Relations, London, England			
Research and teaching in the field of psychiatry (RF 49003).....	32,698.42	.....	14,007.82
University of Cambridge, England			
Research in neurophysiology (RF 46014, 50024).....	19,945.06	.....	2,621.73
Psychological Laboratory. Training and research (RF 46084).....	12,175.56	.....	3,054.06
University College, London, England			
Research in physiology (RF 45085).....	13,534.86	.....	6,042.92
University of Edinburgh, Scotland			
Research in psychiatry, neurology and neurosurgery (RF 47007)...	4,956.81	.....	.....
University of London, England			
Galton Laboratory. Research in problems of human heredity (RF 46085, 50085).....	32,154.67	.....	4,588.39
University of Oxford, England			
Neurohistological research in the Department of Human Anatomy (RF 48058).....	46,371.88	.....	8,113.24

Italy			
University of P'sa			
Support of teaching and research in the Department of Physiology (RF 51100)	\$.....	\$10,900.00	\$2,564.20
Netherlands			
National Health Department. 1950-1952 (IH 49032)	8,000.00	.....	.....
University of Amsterdam			
Support of the Psychosomatic Unit at the Wilhelmina-Gasthuis (RF 51153) .....	.....	58,500.00	5,062.75
Wilhelmina Hospital, Amsterdam			
Research in psychosomatic medicine (RF 47105)	3,804.00	.....	.....
Norway			
Norwegian Ministry of Social Welfare			
Salary increases in Health Department. 1946-52 (HC 46014)	7,500.00	.....	5,000.00
State Department of Health			
Statistical Division. 1947-1949 (IH 46027)	2,142.43	.....	.....
University of Oslo			
Establishment of a research laboratory of respiratory physiology at the Ulleval Hospital (RF 51011) .....	.....	19,500.00	7,418.40
Investigation of the incidence of mental disease (RF 51026) .....	.....	9,000.00	1,405.00
Sweden			
Karolinska Institute, Stockholm			
Research in neurophysiology (RF 49120)	8,400.00	.....	4,400.00
University of Lund			
Research in endocrinology (RF 50165)	11,200.00	.....	7,558.20
Switzerland			
Institute of Water and Sewage Research, Zurich. 1950 (GA 5004)	1,743.60	.....	1,743.60
University of Geneva			
Support of an Institute of Human Genetics (RF 50164)	12,000.00	5,000.00
University of Zurich			
Psychiatric research (RF 50144)	16,800.00	3,244.50

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	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
<i>MEDICINE AND PUBLIC HEALTH — Continued</i>			
<i>Development of the Health Sciences — Continued</i>			
<i>Africa and Asia Minor</i>			
<i>Egypt</i>			
Local health work. 1949-1952 (IH 49033, 50129, GA 5003)	\$24,092.49	\$	\$17,384.07
<i>Iran</i>			
Local health work. 1950-52 (IH 49034, RF 51025)	15,048.08	15,000.00	9,956.51
<i>Australia</i>			
Walter and Eliza Hall Institute of Medical Research, Melbourne, Victoria			
Purchase of equipment to be used in researches on virus diseases (RF 51064) . . . . .	. . . . .	8,300.00	5,744.37
<i>Medical Care</i>			
<i>United States</i>			
American Public Health Association, Washington, D. C.			
Support of Subcommittee on Medical Care. 1950-1953 (IH 49010) . .	30,000.00	. . . . .	15,000.00
Educational Trust of the American Hospital Association, Chicago, Illinois			
National study of the financing of hospital care. 1950-1952 (IH 49011)	50,000 00	. . . . .	20,000.00
<i>Health Insurance Plan of Greater New York</i>			
Study of the recorded experience of the Plan (RF 51070) . . . . .	. . . . .	155,000.00	80,639.00
Study to determine the type of worker, or workers, required to provide certain basic health and social welfare services within the family (IH 50001, RF 51152)	16,700.00	30,358 00	7,660.22
<i>Great Britain</i>			
University of Manchester, England			
Development of an experimental health center (RF 50101)	87,500 00	. . . . .	. . . . .
<i>Professional Education</i>			
<i>United States</i>			
Association of American Medical Colleges, New York			

Medical Film Institute. Production of a critical catalogue of medical motion picture films (RF 50067)	\$10,675 00	\$	\$9,812 06
Bingham Associates Fund of Maine, Boston, Massachusetts Program of postgraduate medical education in certain rural areas and towns in Massachusetts (RF 45073)	25,797 51	.. .	Cr. 11,440 05
Cornell University, Ithaca, New York Statistical consultant in the Department of Preventive Medicine at the Medical College (RF 51119)		30,000 00	6,500 00
Harvard University, Cambridge, Massachusetts General budget, 1946-56 (RF 45109)	500,000 00		100,000 00
Development of legal medicine (RF 44001)	31,244 32		19,013 68
Development of the Department of Dermatology of Harvard Medical School (RF 48039)	82,549 14	.	12,413 86
Johns Hopkins University, Baltimore, Maryland Institute of History of Medicine (RF 49050, 50035, 51074)	75,000 00	30,000 00	30,000 00
School of Hygiene and Public Health. For developmental purposes, 1948-58 (RF 48037)	530,000 00	.	75,000 00
National League of Nursing Education, New York National Committee for the Improvement of Nursing Service. Program of the National Nursing Accrediting Service (RF 51057)		65,000 00	32,500 00
New England Center Hospital, Boston, Massachusetts Postgraduate medical education in certain rural areas and towns in Massachusetts (RF 50100)	100,000 00	.....	40,000 00
Postwar appointments for medical graduates from armed services (RF 44135)	5,000 00	...	Cr. 276 86
Tulane University, New Orleans, Louisiana Salary of a research associate in its law-science program (RF 51188) . . . . .	.	10,000 00	2,500 00
University of California, Berkeley Department of Public Health and Medical Administration, 1950-52 (IH 49015, GA 5020)	15,000 00	10,000.00

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	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
MEDICINE AND PUBLIC HEALTH — Continued			
<i>Professional Education — Continued</i>			
<i>United States — Continued</i>			
University of Colorado, Boulder			
School of Medicine. Conference on the teaching of public health and preventive medicine (RF 51066).....	\$.....	\$15,000.00	\$1,000.00
Washington University, St. Louis, Missouri			
School of Medicine. Teaching of preventive medicine (RF 47042).....	2,421.85	.....	1,000.00
Yale University, New Haven, Connecticut			
Work in the history of medicine (RF 51065).....	.....	15,000.00	3,000.00
Canada			
University of Toronto			
School of Hygiene and Public Health			
Additional teaching personnel. 1946-47 to 1949-50 (IH 46005).....	2,486.07	.....	2,486.07
Field training facilities. 1948-49 to 1950-51 (IH 47052).....	1,405.95	.....	.....
Instruction and studies in medical care. 1949-50 to 1951-52 (IH 48021, GA 5019).....	13,943.64	.....	8,008.60
School of Nursing			
Construction of new building. Period ending December 31, 1953 (RF 45037).....	300,000.00	.....	.....
Mexico			
Training of health personnel in the United States. 1951 (GA 5012)....	1,200.00	.....	489.88
Caribbean Area			
British West Indies Training Station, Jamaica. 1945-46 to 1950-51 (IH 49021).....	9,034.27	.....	5,102.01
South America			
Brazil			
Araraquara Health Training Center. 1948-1952 (IH 47061, GA 5014, GA 51124).....	19,333.15	.....	4,081.55

Chile			
Catholic University of Chile, Santiago			
Apparatus and research expenses of the Departments of Physiology, Pharmacology, and Biochemistry of the Medical School (RF 51131).....	\$.....	\$7,500.00	\$956.24
School of Public Health, University of Chile, Santiago Courses for Sanitary Engineers (GA 51121).....	4,000 00	.....	.....
Colombia			
National School of Hygiene, Bogotá			
General expenses. 1948-1952 (IH 48007).....	30,000 00	.....	15,318.34
National Superior School of Nursing, Bogotá			
Teaching unit for psychiatric nursing. 1950-1951 (IH 48013).....	9,000.00	.....	2,100.41
Ecuador			
School of Nursing, Quito			
General expenses. 1943-1951 (IH 47023).....	7,009.97	.....	6,112 11
Uruguay			
University Nursing School, Montevideo			
General budget. 1948-1953 (IH 47054).....	22,774.65	.....	1,301.18
Venezuela			
National School of Nursing, Caracas			
General budget. 1947-1950 (IH 46022).....	13,978 24	.....	2,366.76
Europe			
Belgium			
University of Brussels			
Teaching and research in preventive medicine (RF 47122).....	13,116.10	.....	1,995.00
Denmark			
Danish Technical University, Copenhagen			
Developing teaching and experimental facilities. 1950-1951 (IH 49042).....	1,007 48	.....	552.44

	APPROPRIATIONS		1951 PAYMENTS	472	
	PRIOR YEARS	1951			
MEDICINE AND PUBLIC HEALTH — Continued					
<i>Professional Education — Continued</i>					
<i>Europe — Continued</i>					
Finland					
Helsinki College of Nursing				THE ROCKEFELLER FOUNDATION	
General budget, 1948-1952 (IH 47062)	\$14,665 00	\$	\$11,050.00		
Helsinki Institute of Industrial Hygiene					
Scientific equipment, 1949-1951 (IH 49026)	8,892.50	. . . . .	5,403 76	
Great Britain					
London School of Hygiene and Tropical Medicine, England					
Public health engineering, 1949-1952 (IH 49001)	23,588.01	. . . . .	9,976.82	
Public health practice experiments, 1951-1952 (GA 5024)	10,000 00	. . . . .	5,000 00	
Rehabilitation of teaching and public health personnel, 1945-51 (HC 45002)	27,621 54	. . . . .	13,810 96	
University College, London, England					
Study of medical student selection (RF 48008)	12,003.70	. . . . .	2,652 83	
Italy					
University of Rome					
Engineering School. Development of teaching facilities, 1948-1951 (IH 48008)	4,458.51	. . . . .	2,800 00	
Netherlands					
Institute of Preventive Medicine, Leiden					
Development of institute, 1948-1952 (IH 47064, 49035)	51,825 28	. . . . .	19,147 38	
University of Utrecht					
Teaching and research at the Institute of Clinical and Industrial Psychology (RF 51132) . . . . .	. . . . .	12,750.00	1,674 79	
Norway					
Ministry of Health					

Postgraduate course of study in public health and development of practice fields. 1946-51 (HC 46015).....	\$4,500 00	\$	...	\$4,500 00
Sweden				
State Institute of Public Health, Stockholm				
Equipment. 1951 (GA 5021)	4,300.00	.	...	553 11
Switzerland				
Le Bon Secours School of Nursing, Geneva				
General budget. 1948-1952 (IH 47033).	10,491.93	..	.	1,791 02
Yugoslavia				
Development of School of Public Health Engineering at Institute of Hygiene and School of Engineering. 1951-1953 (IH 50127)	25,000 00	.	.....	12,644 04
Institute of Hygiene, Zagreb				
Equipment and maintenance. 1946-51 (HC 46016,	246 77	.	...	.. . . .
Miscellaneous				
Microfilms for schools and institutes of hygiene in Europe (C-11)	10.94	.	...	.. . . .
Far East				
Ceylon				
National School of Nursing				
Developmental aid. 1948-53 (IH 48005)	10,655.52	.	.....	5,188 20
China				
National Institute of Health				
General budget. 1949 (IH 48031)	1 62	.	.....	Cr. 63
Japan				
Institute of Public Health, Tokyo				
Books, periodicals and teaching aids. 1948-1949 (C-11)	223 08	.	...	21.51
Teaching materials. 1950-1951 (IH 49036, GA 5008)	3,812 27	.	.....	3,501 05
Purchase of medical books and periodicals to be distributed to various medical schools in Japan upon recommendation of the Japanese Council on Medical Education (RF 51099)	10,000.00		195 00

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	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
MEDICINE AND PUBLIC HEALTH — Continued			
<i>Professional Education — Continued</i>			
<i>Australia</i>			
University of Melbourne			
Equipment and supplies for the Department of Physiology (RF 51162).....	\$.....	\$6,000.00	\$.....
<i>Miscellaneous</i>			
Journals, periodicals and books for public health institutions and schools in need of assistance as a result of the war. 1945-50 (HC 45012, GA 5015).....	5,946.77	.....	2,178.05
<i>Fellowships and Grants in Aid</i>			
<i>Fellowships</i>			
Administered by The Rockefeller Foundation (RF 47134, 48101, 48138, 49144, 50153, 51220, IH 46055, 47055, 48032, 49037, 50152).....	803,925.72	400,000.00	409,619.61
Health Commission. 1945-1948 (HC 47030).....	1,290.19	.....	.....
<i>Medical Library Association, Detroit, Michigan</i>			
Fellowships in medical librarianship (RF 51075).....	.....	30,000.00	4,000.00
Medical Research Council, London, England (RF 50016).....	48,488.24	.....	24,876.93
<i>National Research Council, Washington, D. C.</i>			
Medical sciences (RF 46133, 50084, 51151).....	55,680.33	125,000.00	25,000.00
Welch Fellowships in internal medicine (RF 41028).....	51,458.01	.....	19,498.79
<i>Grants in Aid</i>			
Administered by The Rockefeller Foundation (RF 45123, 46120, 46139, 47089, 47138, 48142, 49148, 50090, 50157, 50158, 51159, 51224).....	376,353.98	600,000.00	185,296.35

Special Emergency Grant in Aid Fund			
Scientific equipment for medical science laboratories of universities and technical schools in the Netherlands (RF 45089).....	\$2,173.33	\$.....	\$1,432.12
<i>Field Service</i>			
Field Staff			
Salary, travel and other expenses			
1950-1951 (IH 49038, 50122, RF 51042).....	928,642.37	16,044.00	687,987.49
1952 (RF 51198).....	.....	720,300.00	.....
<i>Miscellaneous</i>			
Director's Fund for Miscellaneous Expenses (IH 48004).....	3,420.37	.....	251.54
Director's Fund for Supplementing Approved Projects (IH 44006, C-11) ..	4,302.89	.....	.....
Exchange Fund (IH 33077).....	21,365.22	.....	.....
Pan American Sanitary Bureau, Washington, D. C.			
Toward headquarters' purchase fund. 1951 (IH 50131).....	400,000.00	.....	125,000.00
Population Studies. 1949-1950 (IH 48039).....	2,807.13	.....	62.13
Revolving Fund to provide working capital (RF 29093).....	200,000.00	.....	.....
Rockefeller Institute for Medical Research, New York			
General expense of administration and operation. 1951, 1952 (RF 50125, 51200).....	50,000.00	50,000.00	50,000.00
University of Ceylon			
Department of Physiology and Pharmacology of the Medical College			
Field studies in social medicine. 1950-1951 (GA 5007).....	3,960.00	.....	3,810.00
Department of Sociology. Sociological studies. 1950-1951 (GA 5006) ...	3,960.00	3,810.00
TOTAL — MEDICINE AND PUBLIC HEALTH.....	\$7,646,301.11	\$3,796,270.00	\$3,416,814.79

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NATURAL SCIENCES AND AGRICULTURE	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
<i>Experimental Biology</i>			
Amherst College, Massachusetts			
Research in biology (RF 46095, 51110)	\$3,500.00	\$47,700.00	\$3,500 00
Auckland University College, University of New Zealand			
Equipment for investigations on the plant products of New Zealand (RF 49124)	2,497 06	.....	2,100 63
California Institute of Technology, Pasadena			
Research programs in biology and chemistry (RF 48030)	405,853.64	.....	27,298 81
Carlsberg Foundation, Copenhagen, Denmark			
Research in biochemistry (RF 46107, 51157)	3,542 79	42,500 00	7,125.13
Centre National de la Recherche Scientifique, Paris, France			
Scientific equipment for the Institute of Genetics at Gif (RF 50034) . . .	54,000 00	.....	.....
Columbia University, New York			
Research on enzymes in the Department of Medicine, College of Physicians and Surgeons (RF 48043, 50043)	7,489.49	.....	2,637.52
Research in immunochemistry (RF 48066, 51018)	10,000.00	42,000.00	10,000 00
Research in genetics and experimental zoology (RF 48076, 51069)	29,607 61	90,000.00	13,583 71
Research in the Department of Biochemistry at the College of Physicians and Surgeons (RF 50078, 51006)	7,200 00	50,000.00	23,600 00
Research in biochemistry (RF 51186) . . . . .	.....	20,000 00	5,000 00
Connecticut Agricultural Experiment Station, New Haven			
Research in genetics (RF 48018)	7,216.46	.....	1,780 00
Cornell University, Ithaca, New York			
Research in enzyme chemistry (RF 49082)	21,055.83	.....	651 83
To assist in establishing an electron microscope laboratory (RF 49069) . .	18,750.00	.....	4,249.38
Support of the Maize Genetics Cooperation Project (RF 51133) . . . . .	.....	3,800 00	1,900 00
Duke University, Durham, North Carolina			
Research on physical biochemistry of proteins (RF 46096, 49070)	105,000 00	.....	7,004 02

Federal Technical Institute, Zurich, Switzerland

Laboratory of Organic Chemistry. Research on constitution and synthesis of physiologically active compounds (RF 46099).....

\$40,496 63 \$ \$5,725 00

Research on chemistry of physiologically important compounds (RF 51058)

54,000 00 6,000 00

Harvard University, Cambridge, Massachusetts

Basic studies in chemotherapy (RF 48020, 51134).....

17,100 76 15,000 00 17,100.76

Research in the Medical School on problems of tissue structure (RF 46019, 51052).....

7,054 76 64,000.00 7,500.00

Research in enzyme chemistry (RF 50020).....

13,500 00 1,282 40

Research in biophysical chemistry in the Department of Chemistry (RF 51013)

..... 15,000 00 6,800 00

Research on biological and medical importance of trace elements (RF 51214).....

..... 100,000 00

Haskins Laboratories, New York

Research in protozoological chemistry (RF 50110)

8,000 00 5,500 00

Indiana University, Bloomington

Research in genetics (RF 51051).....

.. 200,000.00

Iowa State College, Ames

Research in physiological genetics (RF 49028)....

12,000 00 . 6,000.00

Research in protein chemistry (RF 51028)...

. 12,000.00 4,000.00

Johns Hopkins University, Baltimore, Maryland

Biochemical research (RF 50105).

20,000.00 5,375.00

Karolinska Institute, Stockholm, Sweden

Anatomical Institute. Research equipment (RF 50113).....

1,400 00 495.89

Institute of Chemistry. Research in biochemistry (RF 47100).....

24,714 64 11,720.95

Institute for Cell Research. Research (RF 49030)

10,000.00 4,936.81

Research in the Department of Biochemistry of the Medical Nobel Institute (RF 50017)

34,992 86 17,408 84

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	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
NATURAL SCIENCES AND AGRICULTURE — Continued			
<i>Experimental Biology — Continued</i>			
Long Island Biological Association, Cold Spring Harbor, New York			
Modernizing physical plant of biological laboratory (RF 50064) . . .	\$22,000 00	\$. . .	\$22,000 00
Marine Biological Laboratory, Woods Hole, Massachusetts			
Modernization of laboratory building and general support (RF 48131, 51056)	55,000 00	75,000 00	70,000 00
Massachusetts General Hospital, Boston			
Research in enzyme chemistry (RF 48135, 50039)	34,300 00	. . .	34,300.00
Equipment for the Spectroscopic Laboratory (RF 51023) . . . . .	. . . . .	21,310 00	19,731 56
Massachusetts Institute of Technology, Cambridge			
Joint project in mathematical biology with the National Institute of Cardiology, Mexico, D.F. (RF 47009)	4,127 44	. . . . .	1,372 73
Research in biology (RF 47039)	100,000 00	. . . . .	50,354 73
Research in the physical chemistry of protein solutions (RF 45107) . .	36,724.20	. . . . .	12,855.80
Research in X-ray crystallography (RF 51030) . . . . .	. . . . .	11,000 00	4,100 00
Montreal General Hospital, Quebec, Canada			
Biochemical research (RF 50046)	24,465.32	. . . . .	5,290 53
National Research Council, Washington, D. C.			
United States National Committee of the International Union of Crystallography. Publication program (RF 50166)	10,000 00	. . . . .	3,000 00
Support of American Institute of Biological Sciences (RF 51117) . . . .	. . . . .	40,000.00	8,750 00
Support of program of Committee on Development of Biology (RF 51123) . . . . .	. . . . .	25,000 00	. . . . .
Northwestern University, Evanston, Illinois			
Research in the physical chemistry of proteins (RF 49058)	13,500 00	. . . . .	8,267.20
Pennsylvania State College, State College			
Biophysical research (RF 51124) . . . . .	. . . . .	20,000.00	3,504.00

Polytechnic Institute of Brooklyn, New York			
Research on protein structure (RF 50069, 51180)	\$102,645 00	\$32,500 00	\$
Princeton University, New Jersey			
Research in genetics (RF 51136) . . . . .	.....	15,000 00	2,500.00
Research in organic chemistry (RF 40058)	4,866.72	.....	Cr. 200.00
Purdue University, Lafayette, Indiana			
Research in genetics (RF 49104)	7,500.00	. . . . .	5,000 00
Smith College, Northampton, Massachusetts			
Work in genetics (RF 50044, 51032).....	4,000.00	9 000.00	8,500.00
Stanford University, Palo Alto, California			
Biochemical research (RF 51076) . . . . .	... . . . .	30,000.00	5,000.00
Research in biochemistry of nucleic acids (RF 48109, 51077)	4,995.05	36,000.00	10,081.00
Research in biochemical genetics (RF 49057).....	15,300.00	... . . . .	3,379.22
Research in physical biochemistry (RF 51102)....	.....	13,000 00	6,500.00
Research on protein chemistry (RF 48064).....	2,094.90	.....	1,712.00
Research in microbiology (RF 48065).....	2,223.84	.....	.....
Tufts College, Medford, Massachusetts			
Program on nucleic acid chemistry (RF 51021) . . . . .	.....	30,000.00	10,000.00
University College, Dublin, Ireland			
Research in biochemistry in the Department of Biochemistry and Pharmacology (RF 51029).....	.....	12,000.00	6,027.62
University of Alabama, University			
Program on glycoproteins (RF 51012).....	.....	10,700 00	3,955.00
University of Amsterdam, Netherlands			
Research on tissues in the Laboratory of Histology (RF 50095).....	4,500.00	.....	3,000.00
University of Bern, Switzerland			
Theodor Kocher Institute. Equipment and assistance to foreign guests (RF 50074)	20,000 00	7,850.40
Equipment for Institute of Botany (RF 50080).....	5,000.00	5,000.00

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	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
NATURAL SCIENCES AND AGRICULTURE — Continued			
<i>Experimental Biology — Continued</i>			
University of Birmingham, England			
Research in biochemistry (RF 51137).....	\$.. .	\$13,500 00	\$.. . .
University of Brazil, Rio de Janeiro			
Research at the Institute of Biophysics (RF 49020).....	7,358 66	.. ..	5,785 01
University of Brussels, Belgium			
Equipment for research in biochemical embryology (RF 50096) . . .	15,000.00	.. ..	11,856 69
University of California, Berkeley			
Construction and installation of cyclotron (RF 42001).....	37,237.04	.....	.....
Basic equipment for research in biochemistry with special emphasis on virus studies (RF 48132).....	35,000.00	.....	35,000.00
Research in biochemistry (RF 49059, 51078).....	13.73	25,200 00	3,020.00
Research in the comparative biochemistry of marine organisms (RF 49009).....	14,043 99	.....	3,600.00
University of Cambridge, England			
Cavendish Laboratory. X-ray crystallography research equipment (RF 50114).....	5,000.00	.. ..	4,289.51
Moltano Institute of Biology and Parasitology			
Research in cell physiology (RF 47101).....	14,872 86	.....	4,690 61
Equipment to be used in the University Chemical Laboratory (RF 49041).....	1,981 92	.....	.....
Equipment for research in biochemistry (RF 51138)....	.	15,000 00	2,860.78
Research on biologically important materials (RF 51112) ..	.	82,500 00	.....
University Chemical Laboratory. Research equipment and supplies (RF 50112).....	6,536.40	.....	3,048.39
University of Chicago, Illinois			
Research in animal ecology (RF 50026).....	6,000 00	.....	.....
Research in experimental ecology (RF 50094)....	6,935 00	.. ..	1,565 00

University of Copenhagen, Denmark			
Research on the biological uses of isotopes (RF 49094 51158)	\$4,325 75	\$32,000 00	\$4,325 75
Research in biochemistry, physiology, embryology and genetics (RF 49029)	13,701 90	.. .. .	8,771 44
Conferences of European scientists interested in problems of microbial genetics (RF 50115)..	5,000 00	.. .. .	2,500 00
University of Edinburgh, Scotland			
Department of Animal Genetics. Establishment of several studentships for young scientists (RF 50116)	5,700 00	.....	2,800 94
Department of Chemistry. Equipment (RF 50106, 51033).. . . .	17,000 00	2,500 00	17,400 46
University of Geneva, Switzerland			
Research in organic chemistry (RF 50081).	12,705 00	..	4,613 00
University of Glasgow, Scotland			
Equipment for research in the natural sciences (RF 49125).. . . .	7,000.00	.. . . .	7,000 00
University of Graz, Austria			
Research in zoology (RF 49095).	10,000 00		6,406 18
University of Illinois, Urbana			
Research in insect biochemistry (RF 50093)..	9,000 00	.. . . .	3,000 00
University of London, England			
Birkbeck College. Equipment for X-ray analysis (RF 48078)	12,501 90	....	716.61
King's College			
Research in molecular biology (RF 47082)	588.19	.. . . .	10 06
Research in biophysics (RF 50065)	33,500.00	.. . . .	6,129.92
Imperial College of Science and Technology. Research on vitamins, sterols and related compounds (RF 38070)			
	11,978.48	.. . . .	.. . . .
University of Lund, Sweden			
Research in genetics (RF 51189) . . . . .	.. . . .	15,000 00	7,500.00
University of Manchester, England			
Equipment for Department of Organic Chemistry (RF 50058).. . .	15,000.00	.....	12,380.58
University of North Carolina, Chapel Hill			
Research in mathematical and experimental genetics (RF 49079). . . .	7,500.00	7,500 00

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NATURAL SCIENCES AND AGRICULTURE — <i>Continued</i>	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
<i>Experimental Biology — Continued</i>			
University of Nottingham, England			
Equipment for research in biochemistry (RF 49129)	\$485 43	\$.	\$1 22
University of Oslo, Norway			
Research in plant physiology and X-ray crystallography (RF 51190)	. . . . .	15,000 00	.....
University of Oxford, England			
Dyson Perrins Laboratory of Organic Chemistry			
Research in organic chemistry (RF 47084, 51155)	4,717.12	30,000.00	5,181.13
Equipment for research (RF 49122)	1,477 40	.....	1,081.18
Sir William Dunn School of Pathology			
Research on antibiotics (RF 46021, 47003)	1,553 08	. . . . .	.....
Research in crystallography (RF 49123)	3,958 43	..	1,400.00
University of Paris, France			
Research in biochemistry in the Laboratory of Biological Chemistry (RF 51187) . . . . .	. . . . .	25,000.00	. . .
University of Pittsburgh, Pennsylvania			
Research on the chemistry of proteins (RF 49019)	8,000 00	. . . . .	5,500 00
University of Rochester, New York			
Microphotometric studies of biological tissues (RF 49114) .	18,762 21	. . . . .	. . . . .
University of São Paulo, Brazil			
Faculty of Medicine			
Research in Laboratory of Histology and Embryology (RF 51103)	. . . . .	14,000 00	612.40
University Radiochemistry Laboratory. Work with radioactive isotopes in experimental biology and medicine (RF 50146)	13,600 00	. . . . .	5,985.75
Faculty of Philosophy			
Equipment for research in the Department of Physics (RF 45061)	5,767 69	. . . . .	Cr 28 66

University of Sheffield, England			
Research in biochemistry (RF 51114)	\$.	\$35,000 00	\$1,740.56
University of Stockholm, Sweden			
Research in biochemistry (RF 50011)	7,004 66		4,558.70
Research in radiobiology (RF 50027).	2,844.10	.. ..	1,509 89
University of Tennessee, Knoxville			
Research in biochemistry (RF 50012)	3,500 00	.	3,476 92
University of Texas, Austin			
Research in genetics (RF 49042, 51089)..	3,000 00	50,000 00	8,000 00
Research in genetics of drosophila (RF 49027)	14,500 00	.. . .	9,962 44
University of Uppsala, Sweden			
Researches in Institute of Physiology (RF 49126)	4,900 00	.	1,200 00
Equipment for research on proteins and polysaccharides (RF 49142)	80,251 93	.. ..	49,468.24
University of Utrecht, Netherlands			
Research in biophysics and biochemistry (RF 49113).	16,000 00	.. . . .	5,999 43
University of Virginia, Charlottesville			
Research in thermodynamics of enzyme action in the Department of Medicine (RF 50008)	20,000.00	.....	12,000.00
University of Washington, Seattle			
Purchase and installation of electron microscope for use in research in microanatomy (RF 50004)	255.02	.....	.. . . .
Research in physical biochemistry of proteins (RF 51091) . . . . .	.....	24 000.00	6,000.00
University of Wisconsin, Madison			
Research in biochemistry of symbiotic nitrogen fixation (RF 46118, 51171)	5,718.32	28,750 00	5,000.00
Research in genetics (RF 51191) . . . . .	.. ..	8,000 00	.. . . .
Research in metabolism of plant tissues (RF 51009) . . . . .	.. ..	45,000 00	3,750.00
Research in physical chemistry of the proteins (RF 50059)	12,500 00	.. . . .	5,000.00
Research in cytogenetics (RF 50048).	25,000.00	.....	10,000.00
Research program on enzyme chemistry (RF 50047)	17,500.00	2,500.00
Scientific equipment for the Enzyme Institute (RF 48031)	25,000 00

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	APPROPRIATIONS		1951 PAYMENTS
	PRIOR YEARS	1951	
<i>NATURAL SCIENCES AND AGRICULTURE — Continued</i>			
<i>Experimental Biology — Continued</i>			
Uruguay, Ministry of Public Health, Montevideo			
Equipment and expenses for the Research Institute of Biological Sciences (RF 49008)	\$10,007.70	\$	\$4,515.10
Washington University, St. Louis, Missouri			
Research in experimental embryology (RF 50037)	20,800.00	. . . . .	5,200.00
Biochemical research (RF 49117)	34,128.38	. . . . .	. . . . .
Worcester Foundation for Experimental Biology, Massachusetts			
Research on the physiology of mammalian eggs and sperm (RF 50082) . .	22,500.00	. . . . .	7,500.00
Yale University, New Haven, Connecticut			
Research on proteolytic enzymes (RF 48133)	7,818.15	. . . . .	7,800.00
Research in the Department of Botany (RF 48032)	25,000.00	. . . . .	9,522.17
Biochemical research (RF 51168) . . . . .	. . . . .	80,000.00	7,000.00
Zoological Station of Naples, Italy			
General expenses and equipment (RF 51059) . . . . .	. . . . .	25,000.00	5,733.13
<i>Agriculture</i>			
Brazil			
University of São Paulo			
Equipment and supplies for work in the Faculty of Veterinary Medicine (RF 51163) . . . . .	. . . . .	14,500.00	. . . . .
Institute of Agronomy, Campinas, State of São Paulo			
Research on plant viruses (RF 49156)	15,000.00	. . . . .	10,358.10
Work in microbiology and irrigation (RF 50148)	20,000.00	. . . . .	11,415.95
Biological Institute, São Paulo (RF 50149)	20,000.00	. . . . .	5,851.15
School of Agriculture, Piracicaba (RF 50147)	20,000.00	. . . . .	504.71

Chile

Ministry of Agriculture, Santiago

Cooperative project to establish on full-time salaries Chilean agricultural scientists engaged in food production programs (RF 49155).....

\$12,000 00 \$ \$

Colombia

Collaborative Operating Program in Agriculture in Colombia (RF 49127, 50138, 51027, 51045, 51206).....

63,703 13 135,600 00 57,226 54

Ministry of Agriculture

Experimental greenhouse (RF 51101).....

. . . 15,000 00 9,126 62

National University of Colombia

Faculties of Agronomy at Medellín and Palmira

Toward cost of student dormitory at each of these agricultural colleges (RF 50102).....

50,000 00 . .

Faculty of Agronomy, Medellín

Equipment (RF 47117).....

17,900 82 . 4,403 41

To send outstanding graduating class students for specialized training with The Rockefeller Foundation's agricultural staff in Mexico (RF 48072, 50079).....

15,608.93 . . . 5,365 79

Teaching and research facilities, study trips of staff members, and to assist in bringing foreign visiting professors to the faculty (RF 49031).....

16,814.24 . . . 12,156 54

Faculty of Agronomy, Palmira

Equipment (RF 47118).....

337 77 270 30

Equipment for a second scientific laboratory building (RF 51084).....

. 40,000 00

Teaching and research facilities, study trips of staff members, and to assist in bringing foreign professors to the faculty (RF 51085).....

. 15,000.00 1,188.80

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NATURAL SCIENCES AND AGRICULTURE — *Continued**Agriculture — Continued*

Costa Rica

Inter-American Institute of Agricultural Sciences, Turrialba

Development of a tropical dairy cattle project (RF 50057)..... \$ 5,600.00 \$..... \$.....

Strengthening the library resources and making possible the develop-
ment of a scientific communication program (RF 49077)..... 35,989.79 10,506.73

Honduras

Pan American Agricultural School, Tegucigalpa

Scholarships for practical experience with the Foundation's agricul-
tural program in Mexico, or study in the United States (RF
49157)..... 9,000.00 5,000.00

Mexico

Inter-American Symposium on Plant Breeding, Mexico, D. F. Expenses
(RF 49100)..... 4,769.41 4,654.98Inter-American Symposium on Plant Pests and Diseases, Mexico, D. F.
Expenses (RF 50028)..... 3,435.87 1,568.06Inter-American Symposium on Plant Breeding, Pests and Diseases,
Mexico, D. F.To be held under the joint auspices of Brazilian agencies and the Of-
fice of Special Studies, Secretariat of Agriculture and Animal Indus-
try of Mexico, and for expenses of the continuing joint committee
(RF 51135)..... 15,000.00

Latin American scholarships (RF 50151, 51120)	\$50,000.00	\$53,000 00	\$7,100 62
Mexican Agricultural Program. General expenses (RF 49109, 49136, 50137, 51040, 51044, 51148, 51193, 51205)	443,923.82	324,148.00	306,105 09
Expansion of staff in Mexico for training purposes (RF 51207) . . . . .	.....	60,000.00	. . .
Research, demonstration and extension program, State of Mexico (RF 51210).....	.....	100,000 00	
Secretariat of Agriculture and Animal Industry National College of Agriculture at Chapingo Teaching and research facilities, materials for the college library, and travel of visiting professors (RF 49018).	2,314.07	.	.
Technological Institute, Monterrey Equipment and supplies for the Department of Agronomy (RF 49101)	172 94	..	
Mexico and Colombia Scientific aides Temporary (RF 51208) . . . . .	.	40,000 00	.. . . .
Special Temporary (RF 51209). . . . .	.....	30,000 00	. . . . .
Peru University of San Marcos, Lima Faculty of Veterinary Medicine. Equipment and supplies (RF 49103, 50150).....	67,277 32	.....	19,475.40
United States University of North Carolina, Chapel Hill Research in mathematical and experimental genetics under the aus- pices of the Institute of Statistics (RF 51125).....	. . . . .	25,000 00	12,500 00

NATURAL SCIENCES AND AGRICULTURE — <i>Continued</i>	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
<i>Fellowships and Grants in Aid</i>			
<i>Fellowships</i>			
Administered by The Rockefeller Foundation (RF 45080, 47135, 48139, 49145, 50154, 51221)	\$375,901 05	\$300,000 00	\$181,010 00
Brown University, Providence, Rhode Island			
Support of scholarships, assistantships and fellowships in advanced applied mathematics (RF 46063)	1,628 75	. . . . .	280 00
National Research Council, Washington, D. C. (RF 49084, 50054, 51150)	101,133 96	150,000.00	55,888 10
New York University, New York			
Development of graduate work in applied mathematics (RF 46009)	12,584 59	.	12,584 59
<i>Grants in Aid</i>			
Administered by The Rockefeller Foundation (RF 46106, 47058, 47139, 48143, 49149, 50159, 51225).	484,925 32	450,000 00	239,378 29
Emergency scientific reconstruction, Italy			
Equipment, consumable supplies and other materials for Italian scientists (RF 48067)	404 07	.	.
Special Emergency Grant in Aid Fund			
Scientific equipment for natural science laboratories of universities and technical schools in the Netherlands (RF 45089)	7,402 60	..	1,432 12
<i>Other Subjects</i>			
American Academy of Arts and Sciences, Boston, Massachusetts			
Support of activities aimed at making more sound and effective the interrelationships between the various branches of the natural sciences, the social sciences and the humanities (RF 49085).	4,500 00	.. .	3,000 00

Centre National de la Recherche Scientifique, Paris, France			
Special equipment for natural science research laboratories of France (RF 46048)	\$1,825 43	\$	\$1,825 43
Travel of non-French delegates to conferences of scientists (RF 46049)	21,472 55	. . . . .	7,839 25
China Medical Board, Inc., New York			
Peiping Union Medical College, China			
Human paleontological research in Asia (RF 45024)	17,144 02	. . . . .	7 03
Conservation Foundation, The, New York			
Operating and administrative expenses, and support of projects (RF 49056)	20,000 00	. . . . .	20,000 00
Soil erosion survey of North and South America (RF 51229)		10,000 00	.
Toward administrative budget, for Spanish and Portuguese sound tracks for educational films on conservation, for a preliminary survey of possibilities of research in marine resources, and for research in water resources (RF 51001).	. . . . .	117,000.00	41,939 89
Harvard University, Cambridge, Massachusetts			
For research, and publication of research in the history of science (RF 47013).	2,504 63	. . . . .	.
Institute for the Unity of Science, Cambridge, Massachusetts			
Support of activities (RF 47131)	9,000 00	. . . . .	.
National Research Council, Washington, D. C.			
Expenses of its Office of Scientific Personnel (RF 51031)	. . . . .	9,000 00	9,000.00
Princeton University, New Jersey			
Research in social physics (RF 50167).	15,000 00	. . . . .	5,000.00
Royal Institution of Great Britain, London			
Davy Faraday Research Laboratory			
Equipment and supplies for the modernization and expansion of workshop and instrument-making facilities (RF 50111)	11,000 00	. . . . .	8,000.00
University of Brazil, Rio de Janeiro			
Full-time professorships in the Faculty of Philosophy (RF 49154)	7,169 00	2,277 00

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	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
NATURAL SCIENCES AND AGRICULTURE — Continued			
<i>Other Subjects — Continued</i>			
University of Chicago, Illinois			
International aspects of a program of meteorite studies (RF 49078) . . .	\$24,560.12	\$	\$8,750.00
Support of advanced training in applied statistics (RF 51087) . . . . .	.....	75,000.00	5,000.00
(Joint project with Social Sciences)			
University of Iceland, Reykjavik			
Building and equipping an Institute of Experimental Pathology (RF 45048, 48110)	29,941.72	.....	1,569.12
University of Oslo, Norway			
Postwar reconstruction of research facilities in natural sciences (RF 46117)	1,204.20	.....	.....
University of São Paulo, Brazil			
Faculty of Philosophy, Sciences and Letters (RF 50145)			
To strengthen the Departments of Genetics, General Physiology, Biochemistry, Botany, Zoology, Chemistry, Mineralogy, and Physical Chemistry	30,000.00	.....	1,625.93
Marine Biological Laboratory. Equipment and supplies	10,000.00	.....	.....
University Research Fund			
Equipment and consumable supplies (RF 47059)	2,613.87	.....	571.88
Research, equipment and supplies for certain of the basic science departments of the Faculty of Philosophy, Science and Letters and for the Department of Biochemistry of the Faculty of Veterinary Medicine (RF 49099)	1,897.36	.....	.....
TOTAL — NATURAL SCIENCES	\$4,137,906.59	\$3,680,208.00	\$1,987,808.42

SOCIAL SCIENCES

American Bar Association Endowment, New York

For use by the Commission on Organized Crime for drafting model statutes designed to deal with organized crime in the United States (RF 50136, 51212).....

\$25,000.00 \$25,000.00 \$25,000.00

American Economic Association, New York

Study of graduate training in economics (RF 51092).....

..... 16,000.00 5,333.33

American Institute of Pacific Relations, Inc., New York

General expenses (RF 50091).....

45,000.00 30,000.00

American Law Institute, Philadelphia, Pennsylvania

Study of development and application of ethical concepts of the Lord Chancellors and the Courts of Equity (RF 49140).....

7,125.00

Preliminary study of needed changes in the criminal law and its administration in the United States (RF 50135).....

20,000.00 20,000.00

Preparation of model criminal code with commentaries (RF 51213).....

..... 222,500.00

American Psychological Association, New York

Research connected with the development of a code of ethical practice for psychologists (RF 49012).....

2,262.26 1,333.49

Bennington College, Vermont

Study of interest-group interaction in the political process (RF 51083).....

..... 27,100.00 4,516.50

Brookings Institution, The, Washington, D. C.

Research and education in the field of international relations (RF 50036, 50083).....

180,000.00 90,000.00

Canadian Institute of International Affairs, Toronto, Canada

General budget (RF 46036).....

6,240.37 2,274.81

Canadian Social Science Research Council, Montreal, Canada

Toward expenses of its program (RF 49098, 51079).....

9,606.45 22,000.00 17,219.44

Toward the costs of fellowships and professorial leaves (RF 48089, 50070, 51080).....

17,338.89 28,000.00 20,323.19

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	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
<i>SOCIAL SCIENCES — Continued</i>			
<i>Carnegie Foundation at The Hague, Netherlands</i>			
Purchase of books, periodicals, and pamphlets and for cataloguing (RF 47028).....	\$4,482.85	\$.	\$3,750.00
<i>Columbia University, New York</i>			
Development of a program of Far Eastern studies through the various social science departments (RF 48041).....	73,850 00	. . . . .	8,302.05
Program of the Institute for Urban Land Use and Housing Studies (RF 51003).....		66,000 00	33,000.00
Program of training in the social sciences (RF 51170).....		60,000.00	. . . . .
School of International Affairs. General support of the Russian Institute (RF 45034, 50133).....	481,859 87		121,176 14
<i>Committee on Research in Economic History, Inc., Cambridge, Massachusetts</i>			
Research and training in economic history (RF 50103)	47,500 00		22,500.00
<i>Community Service Society of New York, New York</i>			
Institute of Welfare Research. Studies of the results of social case work (RF 49130).....	2,500 00		2,500 00
<i>Cornell University, Ithaca, New York</i>			
Pilot study of social adjustment in old age (RF 50118).....	5,000 00		5,000 00
Program of research on community action and intergroup relations (RF 50104).....	95,000 00		33,470 00
Research in the field of group hostility and prejudice (RF 48004)	9,345 00		9,345 00
Study of data collected in the Manzanar and Poston war relocation communities (RF 48136).....	750 55		748 04
Study of the relation of civil rights to the control of subversive activities in the United States (RF 50066, 51142)	17,396 40	6,000.00	20,387.15

Council on Foreign Relations, New York			
General research program (RF 51002)	\$	\$45,000 00	\$45,000 00
History of the foreign relations of the United States during World War II (RF 46002)	1,175 22	. . . .	. . . .
Studies of British-American relations, in cooperation with the Royal Institute of International Affairs (RF 51093) . . . . .	. . . .	16,000 00	16,000 00
Study of the political implications of the economic development of indus- trialized areas (RF 51149) . . . . .	. . . .	25,000.00	. . . .
Crete Survey			
Expenses of a survey in Crete as a means of exploring ways of raising the standard of living in underdeveloped countries (RF 48102)	164 83	. . . .	123 36
Duke University, Durham, North Carolina			
Studies of differences in state per capita incomes (RF 51072) . . . . .	. . . .	45,000 00	9,446 00
Economic Commission for Europe, United Nations, Geneva, Switzerland			
Study of long-run tendencies in the European economy (RF 49067, 51128)	19,100 00	23,725 00	19,100 00
Federal Council of Churches of Christ in America, New York			
Program of study of its Department of the Church and Economic Life (RF 48130)	35,000.00	. . . . .	35,000 00
Fellowships			
Administered by The Rockefeller Foundation (RF 48090, 48140, 49146, 50155, 51160, 51222)	261,240 10	225,000.00	99,406 54
Australian-New Zealand Social Science Fellowship Committee, Melbourne, Australia			
Administrative expenses (RF 51067) . . . . .	. . . .	1,000 00	1,000 00
Columbia University, New York			
School of International Affairs. Special fellowships in the Russian Insti- tute (RF 47045)	56,716 37	. . . .	40,321 72
Economic Commission for Europe, United Nations, Geneva, Switzerland			
In-service training scholarships (RF 50041, 51139)	6,000 00	9,000 00	6,000 00

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	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
SOCIAL SCIENCES — Continued			
Fellowships — Continued			
Institut de Science Économique Appliquée, Paris, France			
In-service training scholarships (RF 51035)	\$	\$9,000.00	\$862.07
Social Science Research Council, New York (RF 46053, 48006, 51054)	141,356.55	220,000.00	120,000.00
Foreign Policy Association, New York			
Research and general program (RF 50072)	10,000.00	.....	10,000.00
Gokhale Institute of Politics and Economics, Poona, India			
Economic and demographic research program (RF 51094) . . . . .	. . . . .	23,100.00	1,578.00
Grants in Aid			
Administered by The Rockefeller Foundation (RF 46113, 46141, 48144, 49150, 50109, 50160, 51183, 51226)			
	408,226.98	290,000.00	224,415.40
Harvard University, Cambridge, Massachusetts			
Laboratory of Human Development			
Study of social and cultural factors in child development (RF 50051, 51173)	20,550.00	64,500.00	.....
Laboratory of Social Relations			
Study of comparative values in five cultures (RF 49032, 51175)	30,000.00	100,000.00	30,000.00
Studies of motivated perception (RF 49073)	8,466.67	.....	.....
Program of economic research (RF 47126, 51071)	22,820.08	140,000.00	10,000.00
Research Center in Entrepreneurial History			
For research (RF 49092, 51126)	10,500.00	10,000.00	10,314.55
Special grant in-aid-fund for salaries and/or expenses of visiting scholars (RF 51127) . . . . .	.....	10,000.00	4,500.00
Research in social sciences (RF 35086)	11,372.65	.....	11,372.65
Studies of state election statistics (RF 51082) . . . . .	.....	47,500.00	6,012.50

Studies of labor movements and collective bargaining in certain Western European countries (RF 51141).....	\$	\$5,000.00	\$5,000.00	
Haverford College, Pennsylvania				
Handbook of selected case studies of programs of social and technical assistance to underdeveloped countries (RF 51095).....		20,550.00	15,005.00	
Institut de Science Économique Appliquée, Paris, France				
Research program (RF 49068).....	14,727.24		10,474.37	
Institute for Advanced Study, Princeton, New Jersey				
For assistance and compensation in a program of study and writing (RF 49064).....	17,975.70		5,000.00	
Institute of Economic and Social Research, Paris, France				
General expenses, equipment and printing accumulated studies (RF 47005)	49,852.13			
International African Institute, London, England				
Field studies of the Fulani-speaking peoples of West Africa (RF 51034)....		9,000.00	2,100.00	
Johns Hopkins University, Baltimore, Maryland				
Salaries and travel expenses of European visiting professors in the Department of Political Economy (RF 51111).....		37,500.00	6,250.00	
Study to measure and interpret trends and forces affecting the United States in its international relations (RF 47103).....	850.95			
Library of Congress, Washington, D. C.				
Preparation and publication of an Eastern European accessions list and expansion of monthly list of Russian accessions (RF 51164) (Joint project with Humanities).....		8,700.00	4,350.00	
London School of Economics and Political Sciences, England				
Purchase of land for expansion of school plant (RF 31028).....	8,509.95		356.63	
Department of Sociological and Demographic Research. General expenses (RF 49115).....	39,130.81		7,446.72	

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	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
SOCIAL SCIENCES — <i>Continued</i>			
Mayor's Advisory Committee for the Aged, New York			
Exploration of the problems of adjustment of the aged in New York City (RF 51010).....	\$. . .	\$25,000 00	\$25,000 00
Miami University, Oxford, Ohio			
Studies of population redistribution (RF 46080).....	23,318 64	.. . . .	16,202 42
National Bureau of Economic Research, New York			
General programs and special programs of research in finance and fiscal policy (RF 47120, 49141, 50134).....	1,500,000 00	.....	180,000 00
National Foundation of Political Science, Paris, France			
Program in international relations (RF 51036).....	. . .	1,000 00	917 51
National Institute of Economic and Social Research of Great Britain, London			
General budget (RF 44108, 50075, 51181).....	61,399 45	41,250.00	16,811 25
Expenses of the International Association for Research in Income and Wealth (RF 50006).....	17,500 00	.. . . .	3,500 00
National Opinion Research Center, Chicago, Illinois			
Study of the isolation, measurement and control of interviewer effect in attitude and opinion studies (RF 51068).....	.	12,885.00	12,885 00
Office National des Universités, Paris, France			
Expenses of a section for the social sciences in the École Pratique des Hautes Études (RF 47125).....	3,814 39	.. . . .	3,814 39
Ohio State University, Columbus			
Study of executive positions in educational institutions in its program of leadership studies (RF 48002).....	3,286 78		3,286 78
Pacific Council of the Institute of Pacific Relations, Honolulu, Hawaii			
Toward general expenses and research (RF 50092).....	40,000 00		10,000 00

Princeton University, New Jersey			
Office of Population Research of the School of Public and International Affairs (RF 44109, 48105)	\$130,000 00	\$.	\$39,503 86
Institute of International Studies. General support (RF 51017)		200,000 00	. . .
Public Administration Clearing House, Chicago, Illinois			
To assist the Japan Public Administration Clearing House in developing a public administration service appropriate to needs and conditions of Japanese local government (RF 51140)		10,740.00	10,740 00
Royal Institute of International Affairs, London, England (Chatham House)			
History of the war and of the peace settlement (RF 47071)	26,122 73	. . . . .	7,004 69
Research on the Middle East, the Soviet Union and underdeveloped territories (RF 51062)		45,000 00	14,007.82
Studies in international economic policy (RF 50013)	1,304 16		1,260 84
Royal Statistical Society, London, England			
Library facilities and additional secretarial and editorial assistance (RF 50087)	20,000 00	.	4,859 08
Rutgers University, New Brunswick, New Jersey			
Study of the influence of group orientation on receptivity to communicated values (RF 51104) . . . . .	.	14,000 00	7,000 00
Social Science Research Council, New York			
Administrative budget (RF 48022, 51053)	20,000 00	120,000.00	40,000 00
Capital fund (RF 51203) . . . . .	. . . . .	1,500,000.00	1,500,000 00
Conferences and planning (RF 49046, 51204)	75,000 00	150,000 00	62,500 00
Grants in aid of research (RF 49047, 51055)	25,000 00	75,000 00	23,463 58
Special staff in international relations (RF 49118)	18,970 54	. . . . .	11,466 14
Support of the <i>Current Digest of the Soviet Press</i> (RF 50018, 51218) (Joint project with Humanities)	23,500 00	50,000 00	21,776 40

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	APPROPRIATIONS		1951 PAYMENTS	498	
	PRIOR YEARS	1951			
SOCIAL SCIENCES — Continued					
Stanford University, Palo Alto, California					
Food Research Institute					
International history of food and agriculture during World War II (RF 46041)	\$30,000.85	\$	\$30,000.00	THE ROCKEFELLER FOUNDATION	
Study of Soviet economic development (RF 48042, 50098)	9,857.01	. . . . .	9,857.01	
Program of predoctoral training in agricultural economics research (RF 50086)	36,000.00	. . . . .	6,000.00	
Research program (RF 51060) . . . . .	. . . . .	70,000.00	10,567.99	
Tufts College, Medford, Massachusetts					
Experimental program in the psychiatric approach to training and research in sociology (RF 48087)	594.62	. . . . .	Cr. 715.22	
University of Alberta, Edmonton, Canada					
Research in local government problems (RF 51105) . . . . .	. . . . .	2,000.00	1,000.00	
University of British Columbia, Vancouver, Canada					
Development of a program in Slavic studies (RF 49080)	29,625.00	. . . . .	8,685.63	
University of California, Berkeley					
Institute of Industrial Relations					
Studies of the impact of an aging population on American society (RF 49139)	117,500.00	. . . . .	14,265.65	
University of Cambridge, England					
Toward completion of a history of English criminal law (RF 51096) . . . . .	. . . . .	18,750.00	3,502.34	
Department of Applied Economics					
General budget (RF 46001)	16,628.68	. . . . .	6,990.56	
Study of the social accounts of Cambridgeshire (RF 51177) . . . . .	. . . . .	78,000.00		

University of Chicago, Illinois			
Committee on Study of Later Maturity. Studies of the occupational and retirement adjustments of older people (RF 50107).....	\$20,500 00	\$	\$20,500 00
Program of the Cowles Commission for Research in Economics (RF 48047)	40,000 00		10,000 00
Program in education, training and research in race relations (RF 47031) . .	35,257.77		15,469.39
Research in agricultural economics (RF 48085)	6,366.29		6,366.29
Research on low productivity in American agriculture (RF 51088)....		48,000.00	8,000 00
University of Delaware, Newark			
Study of individual income tax returns in Delaware for years 1925 through 1936 (RF 51178).....		35,000 00	9,400 00
University of Florida, Gainesville			
Study of land tenure systems and land use patterns in certain countries in the Middle East (RF 51192).....		11,450.00	6,904.50
University of Manchester, England			
Faculty of Economic and Social Studies. Research in economics and government (RF 46112, 51097).....	15,745.31	22,500.00	5,603.75
University of Michigan, Ann Arbor			
Program of methodological research in the field of human relations by its Research Center for Group Dynamics (RF 50019).....	41,825.00		17,483.68
University of Minnesota, Minneapolis			
Industrial Relations Center. General expenses (RF 47021).....	41.71		Cr. 4.93
University of Missouri, Columbia			
Study of the rural church as a social institution in Missouri (RF 51216) . .		51,245.00	
University of Notre Dame, South Bend, Indiana			
Research in international relations (RF 49091).....	30,000.00		30,000.00
University of Oslo, Norway			
Institute of Economics. Research program (RF 49097).....	10,000.00		10,000.00

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	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
SOCIAL SCIENCES — <i>Continued</i>			
University of Oxford, England			
Nuffield College			
Additional research faculty in the social sciences (RF 46132)	\$136,782.50	\$	\$15,408.38
University of Toronto, Canada			
Development of Slavic studies (RF 49054)	31,500.00	. . . . .	8,997.61
University of Wisconsin, Madison			
Research in housing (RF 46081)	6,201.30	. . . . .	Cr. 3,967.05
Study of the law and the lumber industry in Wisconsin (RF 48051)	21,775.00	. . . . .	8,750.00
World Peace Foundation, Boston, Massachusetts			
Preparation of volumes in the <i>Documents on American Foreign Relations</i> (RF 49043)	4,000.00	. . . . .	4,000.00
Yale University, New Haven, Connecticut			
Institute of International Studies. Research program (RF 49062)	25,000.00	. . . . .	14,050.00
Studies of communication and attitude change (RF 48003, 51174)	21,111.02	147,900.00	41,510.02
TOTAL — SOCIAL SCIENCES	\$4,899,522.62	\$4,586,895.00	\$3,567,243.01
HUMANITIES			
<i>Studies in Language and Foreign Cultures</i>			
American Board of Commissioners for Foreign Missions, Boston, Massachusetts			
Studies in intellectual and cultural movements in Turkey (RF 49138)	\$22,253.70	\$	\$7,855.19
American Council of Learned Societies, Washington, D. C.			
Committee on Near Eastern Studies (RF 47094)	4,000.00	. . . . .	4,000.00

Fellowships and administrative expenses in connection with summer program of Korean studies at University of California (RF 51039).	\$	87,000 00	\$5,652 62
Preparing materials for Slavic studies in the United States (RF 49053).	20,500 00	.	12,688.10
Procurement and reproduction of materials on Slavic subjects (RF 47127).	38,000 00		28,000 00
Program of translations into English of modern materials in Near Eastern languages (RF 48125).	64,308 01		
American University of Beirut, Lebanon			
Interpretative studies of the modern Arab Middle East (RF 49071)	43,650 00		19,243 62
Colegio de México, Mexico, D. F.			
Programs for advanced study and for training of personnel (RF 48033)	16,640 00	.	16,640 00
Columbia University, New York			
Department of Slavic Languages. Development of teaching materials and methods of research (RF 47047)	14,000 00	.. .	7,495 87
Conference on interpretation of Arab tradition, thought and outlook, to be held in Near East (RF 51005).	.. ..	20,000 00	.. .
Cornell University, Ithaca, New York			
Southeast Asian studies (RF 50139)	325,000 00	.	53,900 00
Grants in Aid			
Special fund for temporary addition of representative Chinese scholars to teaching staffs and projects in the United States (RF 44044).	7,819 12	... ..	Cr. 1,878 71
Harvard University, Cambridge, Massachusetts			
Preparation of a descriptive analysis of the contemporary Russian language (RF 50040)	50,000.00	.....	10,029.39
Indiana University, Bloomington			
Development of East European studies (RF 47002)	5,600 00	..	.

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	APPROPRIATIONS		1951	502
	PRIOR YEARS	1951	PAYMENTS	
HUMANITIES — Continued				
<i>Studies in Language and Foreign Cultures — Continued</i>				
Korean Language Society, Seoul, Korea				
To provide essential materials to publish 20,000 copies each of the five unpublished volumes of its new dictionary of the Korean language (RF 48082).	\$2,128 60	\$..	\$	THE ROCKEFELLER FOUNDATION
McGill University, Montreal, Canada				
Expenses of an Institute of Islamic Studies (RF 51108) . . . . .	.....	214,800 00	.. ....
National Institute of Anthropology and History, Mexico, D. F.				
Development of teaching and research program, and reorganization of library resources (RF 48034)	8,681 12	.... ..	4,100.00
National Tsing Hua University, Kunming, China				
Support of work in humanities (RF 47099)	15,000 00		.	
Occidental College, Los Angeles, California				
Developing humanistic studies in the southwest area of the United States and in northern Mexico (RF 49024)	17,150 00	. .	4,400 00	
Pomona College, Claremont, California				
Development of Far Eastern and Slavic studies (RF 44131)	8,500 00	. ..	6,100 00	
Princeton University, New Jersey				
Development of Near Eastern studies (RF 46066)	9,000 00		4,250 00	
St. Vladimir's Orthodox Theological Seminary and Academy, New York				
Support of research and writing by members of its faculty (RF 50031)	10,500 00	.	5,250 00	
Stanford University, Palo Alto, California				
Development of Far Eastern and Slavic studies (RF 44130)	11,800 00	. .	5,891 04	
University of British Columbia, Vancouver, Canada				
Development of a program in Slavic studies (RF 49080)	29,625 00	.	8,685 63	

University of California, Berkeley			
Development of Slavic and Far Eastern studies (RF 44129)	\$11,100.00	\$	\$8,763.16
Development of personnel in Slavic studies (RF 47128)	19,908.33	. . . . .	8,330.00
Summer program of Korean studies (RF 51038) . . . . .	. . . . .	6,325.00	6,325.00
University of Durham, England			
Study of materials available for an understanding of modern Near Eastern cultures (RF 51176) . . . . .	. . . . .	29,700.00	. . . . .
University of Michigan, Ann Arbor			
Cross-disciplinary studies in the theory of language and symbolism (RF 50140)	69,600.00	. . . . .	40,000.00
University of Pennsylvania, Philadelphia			
Work in modern Indian languages and literatures (RF 47129)	26,423.65	. . . . .	13,975.84
University of the Philippines, Manila			
Library development and research in Philippine history (RF 48111)	9,012.00	. . . . .	5,587.01
University of Toronto, Canada			
Development of Slavic studies (RF 49054)	31,500.00	. . . . .	8,997.62
University of Washington, Seattle			
Development of Far Eastern and Slavic studies (RF 44128)	12,505.76	. . . . .	12,505.76
Far Eastern Institute. Research on the Far East (RF 47035)	37,254.13	. . . . .	15,000.00
Wayne University, Detroit, Michigan			
Preparation of a frequency list of Russian words (RF 49137)	31,842.45	. . . . .	21,532.38
<i>American Studies</i>			
Abraham Lincoln Association, Springfield, Illinois			
Preparing annotated edition of writings of Abraham Lincoln (RF 51143) . . . . .	. . . . .	12,000.00	6,000.00
Columbia University, New York			
Preparation of a biography of Booker T. Washington (RF 51230)	15,000.00

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	APPROPRIATIONS		1951	504 THE ROCKEFELLER FOUNDATION
	PRIOR YEARS	1951	PAYMENTS	
HUMANITIES — Continued				
<i>American Studies — Continued</i>				
Commission on History of Pan American Institute of Geography and History, Mexico, D. F.				
Work on history of the Americas (RF 51118)	\$	\$30,000.00	\$9,440.00	
Program of research in history of ideas (RF 51165) . . . . .	. . . . .	15,000.00	.	
Henry E. Huntington Library and Art Gallery, San Marino, California				
Program of regional studies (RF 50002)	20,000 00	. . . . .	5,000 00	
Library of Congress, Washington, D. C.				
American studies (RF 43095)	19,000 00	. . . . .	. . . . .
McGill University, Montreal, Canada				
Studies in the public and private life of W. L. Mackenzie King (RF 49060)	80,000.00	. . . . .	25,000 00	
Michigan State College, East Lansing				
Studies in midwestern life and history (RF 49025)	8,642.00	. . . . .	6,395.30	
National Archives, Washington, D. C.				
Special fund for producing basic microfilm stocks of research materials and for copying files of the National Archives, in the service of scholars (RF 48061)	45 60	. . . . .	. . . . .
Newberry Library, Chicago, Illinois				
Studies in midwestern culture (RF 47034)	10,760 63	. . . . .	6,100.00	
Stanford University, Palo Alto, California				
Seminars in American studies to be held in Japan (RF 50141)	20,000 00	. . . . .	20,000.00	
Tokyo University, Japan				
Seminars in American studies sponsored jointly by Tokyo University and Stanford University (RF 50142, 51211) (Joint project with Social Sciences)	3,000.00	160,000 00	3,000 00	

University of Cologne, Germany			
Development of a program of American studies (RF 51037)	\$	\$15,000 00	\$476 68
University of Munich, Germany			
Visiting professors from the United States or Canada, and library materials for its Amerika Institut (RF 49096) . . .	29,455 13		16,916 33
University of Oklahoma, Norman			
Development of archival resources on the history and contemporary life of Oklahoma (RF 48062)	9,727 31	.	9,130 54
University of Wisconsin, Madison			
Research and teaching in the materials of American civilization (RF 49081)	19,127 48	..	13,225 00
<i>Libraries</i>			
Association of Special Libraries and Information Bureaux, London, England			
Preparation of a catalogue of periodicals in British libraries (RF 44004)	17,364 45	.....	5,603.13
British Museum, London, England			
To enable the museum to offer to American libraries, at a discount, subscriptions to the new edition of its <i>Catalogue of Printed Books</i> (RF 30076)	45,904 94	....	321.09
University Research Fund, University of São Paulo, Brazil			
Bibliographical information service (RF 45035)	13,140 69	.....	6,490 26
<i>Drama, Film and Radio</i>			
National Theatre Conference, Cleveland, Ohio			
Support of activities, projects and fellowships (RF 49106) . . .	10,000 00	..	10,000 00
New Dramatists Committee, Inc., New York			
General support of its program (RF 51156)		47,500 00	5,750 00
University of Bristol, England			
Development of university program in drama (RF 49119)	15,096 72	.	7,735 69

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HUMANITIES — <i>Continued</i>	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
<i>Other Subjects</i>			
American Council of Learned Societies, Washington, D. C.			
General support, planning, development and fellowships (RF 50033)	\$393,750.00	\$	\$87,500.00
Pacific Coast Committee for Humanities. General support (RF 46091, 51144)	7,000.00	6,000.00	6,655.00
Study of personnel problems in the humanities (RF 49052, 51008)	2,440.00	34,000.00	2,299.06
American School of Classical Studies, Athens, Greece			
Museum to house objects excavated in the Agora (RF 37089)	138,354.94	. . . . .	. . . . .
Antioch College, Yellow Springs, Ohio			
Research and planning in relation to its general education program (RF 51129) . . . . .	. . . . .	15,900.00	6,130.00
Colegio de México, Mexico, D. F.			
Research and a training seminar on contemporary Mexican history (RF 50030, 51219)	11,022.50	18,192.00	11,022.50
Cornell University, Ithaca, New York			
Development of methods, materials and personnel for the teaching of the history of modern science (RF 48124)	23,500.00	. . . . .	8,250.00
Humanities Research Council of Canada, Toronto			
Support of activities in planning and development (RF 48017, 51130) . . .	4,268.58	19,200.00	7,066.44
Institute of International Education, New York			
Expenses of an international arts program in 1952 (RF 51116) . . . . .	. . . . .	25,905.00	12,952.50
Italian Institute of Historical Studies, Naples			
Library materials, scholarships and general support (RF 49007)	10,422.48	. . . . .	5,674.33

Kenyon College, Gambier, Ohio			
Toward payment of writers whose work is published in the <i>Kenyon Review</i> (RF 47037)	\$6,125.35	\$.....	\$4,170.19
National Institute of Economic and Social Research, London, England			
Editorial work on edition of complete works of Alexis de Tocqueville (RF 51167) . . . . .	.....	9,500.00	100.00
Princeton University, New Jersey			
Development of a new course in military history (RF 51215) . . . . .	.....	20,000.00	.....
Expenses of an experimental group in literary criticism (RF 49023) .	10,503.33	.....	5,000.00
University of Bordeaux, France			
Development of work in the humanities (RF 47061) .	6,182.06	.....	5,880.79
University of Cambridge, England			
Downing College			
Salary of an assistant for director of English studies (RF 49016, 51166)	4,347.48	6,900.00	1,870.40
University of Chicago, Illinois			
Special faculty seminar in the college, connected with role of history and philosophy in its general education program (RF 51124) . . . . .	.. . . .	15,150.00	6,283.34
University of Lyon, France			
Development of work in the humanities (RF 47060)	1,972.15	.....	1,972.15
University of Oslo, Norway			
Development of work in the humanities (RF 46047)	2,261.87	.. . . .	.. . . .
University of the South, Sewanee, Tennessee			
Payment of writers whose work is published in the <i>Sewanee Review</i> (RF 48011)	12,498.00	.. . . .	5,308.25
University of Toulouse, France			
Development of work in the humanities (RF 47062)	16,837.38	9,082.37

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	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
HUMANITIES — Continued			
<i>Fellowships and Grants in Aid</i>			
Fellowships			
Administered by The Rockefeller Foundation (RF 47137, 48141, 49147, 50156, 51161, 51223)	\$244,976 48	\$185,000 00	\$123,414 74
American Council of Learned Societies, Washington, D. C. Fellowships in the humanities (RF 48059, 51048, 51049)	50,000.00	400,000.00	125,000 00
Grants in Aid			
Administered by The Rockefeller Foundation (RF 44146, 46121, 47109, 48084, 48145, 49151, 50089, 50161, 51227)	504,298.69	300,000.00	264,071 33
Special Grant-in-Aid Fund			
To enable non-Muslim students of Islam, through visits to Islam, to gain a direct acquaintance with contemporary thought and movements within Islam (RF 51086) . . . . .	.....	30,000.00	5,677 87
Surveys, studies and conferences (RF 48083)	2,578.52	.. .. .	1,200.90
TOTAL — HUMANITIES	\$2,747,906 65	\$1,658,072 00	\$1,206,485 70
MISCELLANEOUS			
American Association of Colleges for Teacher Education, Oneonta, New York Visits and study in this country by group of German leaders in teacher education (RF 49111)	\$17,500 00	\$	\$17,479 65
American Council on Education, Washington, D. C. Committee on Religion and Education Study of relation of religion to general education (RF 51061)		31,616.00	15,808 00

General purposes (RF 50022)	\$150,000 00	\$	\$150,000 00
American Library Association, Chicago, Illinois			
Support of International Youth Library, Munich, Germany (RF 51020)		35,000.00	12,980 00
Association of American Universities, New York			
Study of the financing of higher education and research (RF 49065)	123,207.04		61,603 52
Carnegie Endowment for International Peace, New York			
(Subsequently rescinded) (RF 50117)	15,000 00		
European Rehabilitation			
(RF 48120, 49038)	100,803 27		33,935.93
Exchange Fund (RF 46123)	13,004.16		
Field Offices of The Rockefeller Foundation			
Africa and Asia Minor			
Egypt (Cairo). 1950-1952 (IH 49039, 50123, RF 51197)	12,891.11	10,000 00	8,256 54
Iran (Tehran). 1949-1951 (IH 48034, 49039, 50123)	10,422.96		5,306.45
Canada (Toronto). 1949-1952 (IH 48034, 49039, 50123, RF 51197)	5,900.55	3,500.00	2,320 34
Caribbean Area			
Central Office (Miami). 1949-1952 (IH 48034, 49039, 50123, RF 51197)	7,629.60	5,200.00	4,023.00
Dominican Republic (Ciudad Trujillo). 1950-1952 (IH 49039, 50123, RF 51197)	4,473.94	3,840.00	3,842.60
Europe			
England (London). 1950-1952 (IH 49039, 50123, RF 51197)	4,245.01	10,975.00	1,829.87
France (Paris). 1952 (RF 51197)		78,000.00	
Italy (Rome). 1951-1952 (IH 50123, RF 51197)	8,900.00	10,000.00	4,487.01
Far East			
Central Office (Bangalore). 1949-1952 (IH 48034, 49039, 50123, RF 51197)	11,227.00	9,000.00	8,820.24
Japan (Tokyo). 1949-1952 (IH 48034, 49039, 50123, RF 51197)	2,919.56	2,000.00	605 16

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	APPROPRIATIONS		1951	510 THE ROCKEFELLER FOUNDATION
	PRIOR YEARS	1951	PAYMENTS	
MISCELLANEOUS — Continued				
Field Offices of The Rockefeller Foundation — Continued				
South America				
Bolivia (Cochabamba, La Paz). 1949-1952 (IH 48034, 49039, 50123, RF 51197)	\$5,301.25	\$4,000.00	\$3,205.58	
Brazil (Rio de Janeiro). 1950-1952 (IH 49039, 50123, RF 51197)	11,442.04	9,000.00	6,512.43	
Chile (Santiago). 1949-1952 (IH 48034, 49039, 50123, RF 51197)	7,934.76	5,000.00	5,398.60	
Colombia (Bogotá). 1948-1952 (IH 47057, 48034, 49039, 50123, RF 51197)	12,670.81	3,915.00	6,188.74	
Peru (Lima). 1949-1952 (IH 48034, 49039, 50123, RF 51197)	6,397.66	5,880.00	4,249.13	
Mexico (Mexico, D. F.). 1952 (RF 51197) . . . . .	.. . . .	1,600.00	.. . . .
Miscellaneous. 1951-1952 (IH 50123, RF 51197)	1,530.00	2,000.00	.. . . .
Free University of Berlin, Germany				
Work in the social sciences and the humanities (RF 50063)	20,000.00	.. . . .	10,558.91	
General Education Board, New York				
Support of program for advancement of education in the southern states (RF 46125, 47119, 48122, 51201, 51202)	4,500,000.00	5,001,625.00	4,501,625.00	
Grants in Aid administered by The Rockefeller Foundation				
China (RF 42041)	6,923.41	.. . . .	.. . . .
For allocation by the officers within categories described by Trustee action and within specified limitations of amount and duration (RF 49152, 50056, 50162, 51122, 51228)	60,013.90	80,000.00	47,708.65	
History of the International Health Division. Expenses (RF 50045)	9,967.08	.. . . .	8,889.90	
History of the Rockefeller Boards. Expenses (RF 48029)	13,482.99	.. . . .	11,310.83	
Institute of International Education, New York				
International student exchange (RF 51115) . . . . .	.. . . .	50,000.00	.. . . .

International Press Institute, Zurich, Switzerland				
Maintenance and development (RF 51050)	\$.....	\$120,000 00	\$40,000 00	
McGill University, Montreal, Canada				
For use of the Executive Council of the Universities of the British Commonwealth in connection with its meeting in 1949 (RF 49039)	6,738.54	. . . . .	.
Midwest Inter-Library Corporation, Chicago, Illinois				
General expense of a central depository library (RF 49045)	40,000.00	. . . . .	14,333 06	
National Research Council, Washington, D. C.				
Conference Board of the Associated Research Councils				
Study of human resources and the fields of higher learning (RF 49088)	90,000 00	.....	30,000.00	
Office of the United Nations High Commissioner for Refugees, Geneva, Switzerland				
Survey of refugee problem and most appropriate methods for its solution (RF 51047) . . . . .	. . . . .	100,000 00	60,000 00	
Pacific Science Association, Washington, D. C.				
Establishment of permanent secretariat (RF 49153)	6,000 00	.....	6,000.00	
Rockefeller Foundation Fellowship Directory				
Preparation and distribution (RF 49143, 50163)	30,741.42	.....	26,466.70	
Salzburg Seminar in American Studies, Inc., Austria				
General budget (RF 51073) . . . . .	.....	100,000.00	40,000.00	
United States Book Exchange, Inc., Washington, D. C.				
Program of international exchange by institutions of books, periodicals and similar materials (RF 48127)	15,000.00	.....	15,000 00	
Yale University, New Haven, Connecticut				
Establishment and general support of a carbon 14 dating laboratory (RF 50132)	42,500.00	20,100.00	
TOTAL — MISCELLANEOUS	\$5,374,768.06	\$5,682,151 00	\$5,188,765 84	

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ADMINISTRATION AND SCIENTIFIC SERVICES	APPROPRIATIONS		1951
	PRIOR YEARS	1951	PAYMENTS
Scientific Services			
Prior Years.....	\$64,262.23	\$	\$15,301.20
1951	998,939.57	74,085.02	1,008,044.63
1952 .....	.....	1,034,205.52	.....
General Administration			
Prior Years.....	24,605.22	.. .. .	4,588.31
1951	491,344.43	36,722.98	483,416.56
1952 .....	.....	610,270.48	.....
TOTAL — ADMINISTRATION	<u>\$1,579,151.45</u>	<u>\$1,755,284.00</u>	<u>\$1,511,350.70</u>
TOTALS	<u>\$26,385,556.48</u>	<u>\$21,158,880.00</u>	<u>\$16,878,468.46</u>
Less			
Unused balances of appropriations allowed to lapse. ...	1,236,739.24		
GRAND TOTALS	<u><u>\$25,148,817.24</u></u>	<u><u>\$21,158,880.00</u></u>	<u><u>\$16,878,468.46</u></u>

REFUNDS ON PRIOR YEAR CLOSED APPROPRIATIONS

College of Agriculture, "Antonio Narro," Saltillo, Mexico	(RF 49102)	\$2 07
Columbia University, New York	(RF 47068)	6 20
Encyclopaedia of the Social Sciences, New York	(RF 32114)	1,838 61
Fellowships. Social Sciences. 1947	(RF 47108)	10 55
Grants in Aid. Natural Sciences. 1936	(RF 36079)	2 40
Grants in Aid. Natural Sciences. 1945	(RF 45081)	114.16
Harvard University, Cambridge, Massachusetts	(RF 42109)	1,651.40
Health Insurance Plan of Greater New York	(RF 46131)	45,500.00
Institute for Advanced Study, Princeton, New Jersey	(RF 45046)	15.21
Institute of International Education, New York	(RF 50050)	2,339.43
International Meteorological Organization, Lausanne, Switzerland	(RF 47132)	1,992.14
Kenyon College, Gambier, Ohio	(RF 47098)	362 83
Malaria		
China. 1948.	(IH 47037)	270 00
Medical Library Association, Nashville, Tennessee. Fellowships	(RF 49044)	1,293 31
National Institute of Public Affairs, Washington, D. C.	(RF 47029)	467 91
National Research Council, Washington, D. C.	(RF 46134)	20 00
Princeton University, New Jersey	(RF 48040)	20.25
Social Science Research Council, New York	(RF 47020)	650 45
Social Science Research Council, New York	(RF 48128)	1,941.21
Syphilis		
North Carolina. 1949-1950.	(IH 48010)	130.08
North Carolina. 1948-1949	(IH 47038)	52.93

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REFUNDS ON PRIOR YEAR CLOSED APPROPRIATIONS — *Continued*

Tuberculosis		
Tennessee, 1947-1949	(IH 47012)	\$29.40
University of Birmingham, England	(RF 48099)	2,439.29
University of California, Berkeley	(RF 46111)	647.33
University of California, Berkeley	(IH 48030)	682.47
University of Chicago, Illinois	(RF 41101)	81.23
University of Minnesota, Minneapolis	(RF 48080)	44.19
University of Missouri, Columbia	(RF 50038)	4,322.83
University of Stockholm, Sweden	(RF 48035)	13.89
University of Wisconsin, Madison	(RF 45015)	1,266.68
University of Zagreb, Yugoslavia	(RF 46088)	3,905.29
		<hr/>
		\$72,113.74
		<hr/> <hr/>

TRANSACTIONS RELATING TO INVESTED FUNDS

FOR THE YEAR ENDED DECEMBER 31, 1951

PURCHASED		
\$100,000	Chesapeake & Ohio Ry. Co. Second Equipment Trust 2 $\frac{7}{8}$ s 5/15/52 @ 100.587.....	\$100,586.98
125,000	Chesapeake & Ohio Ry. Co. Second Equipment Trust 2 $\frac{7}{8}$ s 11/15/52 @ 100.746.....	125,932.89
100,000	Chesapeake & Ohio Ry. Co. Second Equipment Trust 2 $\frac{7}{8}$ s 5/15/53 @ 100.806.....	100,806.05
125,000	Chicago, Milwaukee, St. Paul & Pacific R.R. Co. Trustee Equipment Series "EE" 2s 7/1/53 @ 99.175	123,968.81
225,000	Chicago & North Western Ry. Co. Equipment 2nd issue of 1948 2 $\frac{7}{8}$ s 11/1/53 @ 99.466..	223,799.51
175,000	Illinois Central R.R. Co. Equipment Series "EE" 2 $\frac{7}{8}$ s 4/1/52 @ 100.452.....	175,790.96
200,000	Illinois Central R.R. Co. Equipment Series "EE" 2 $\frac{7}{8}$ s 10/1/52 @ 100.57.....	201,141.56
200,000	Illinois Central R.R. Co. Equipment Series "EE" 2 $\frac{7}{8}$ s 4/1/53 @ 100.59.....	201,181.19
100,000	Illinois Central R.R. Co. Equipment Series "U" 3s 5/1/52 @ 100.566.....	100,566.12
100,000	Illinois Central R.R. Co. Equipment Series "U" 3s 11/1/52 @ 100.712.....	100,712.39
100,000	St. Louis, San Francisco Ry. Co. Equipment Series "B" 2 $\frac{7}{8}$ s 8/15/52 @ 100.334....	100,334.16
350,000	Southern Pacific Co. Equipment Series "EE" 2 $\frac{7}{8}$ s 4/1/53 @ 100.957.....	353,350.89
1,000,000	USA Treasury Certificates of Indebtedness 1 $\frac{1}{8}$ s 10/1/52 @ 100.097.....	1,000,967.63
100,000	Wheeling & Lake Erie Ry. Co. Equipment Series "C" 1 $\frac{7}{8}$ s 12/1/51 @ 99.821.....	99,834.32
5,000 Shares	Aluminium Limited Cap. (No par) @ \$99.77 per share.....	498,859.53
10,000 "	Canadian Pacific Ry. Co. Ord. (Par \$25) @ \$33.579 per share.....	335,790.70
14,336 "	Continental Oil Co. (Delaware) Cap. (Par \$5) @ \$104.064 per share.....	1,491,858.82
1,558 "	Fireman's Fund Insurance Co. Cap. (Par \$5) @ \$58.76 per share.....	91,548.67
9,400 "	General Electric Co. Com. (No par) @ \$58.434 per share.....	549,277.85
8,800 "	International Paper Co. Com. (Par \$7.50) @ \$53.589 per share.....	471,581.91

TREASURER'S REPORT

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TRANSACTIONS RELATING TO INVESTED FUNDS — *Continued*

300,000 Shares	Socony Vacuum Oil Co. Cap. (Par \$15) @ \$33.307 per share.....	\$9,992,003.35
500 "	Texas Gulf Sulphur Co. Cap. (No par) @ \$95.238 per share.....	47,618.94
5,000 "	Union Pacific R.R. Co. Com. (Par \$50) @ \$103.94 per share.....	519,705.54
16,030	Weyerhaeuser Timber Co. Cap. (Par \$25) @ \$64.529 per share.....	1,034,404.59
		<hr/>
		\$18,040,623.36
DIVIDENDS IN STOCK		
750 Shares	American Gas & Electric Co. Com. (Par \$10) received on account of ownership of 15,000 shares of said stock of record Aug. 10, 1951. Taken into the books at no value thereby reducing the per share price of the stock owned.....	\$— 0 —
100 "	Dow Chemical Co. Com. (Par \$15), received as a dividend of 2½% on 4,000 shares owned of record Jan. 2, 1951. Taken into the books at no value thereby reducing the per share price of stock owned.....	— 0 —
1,000 "	First National Bank of Chicago Com. (Par \$100), received as a stock dividend on account of ownership of 5,000 shares of said stock on the basis of one-fifth of a share for each one share owned of record Dec. 7, 1951. Taken into the books at no value thereby reducing the per share price of stock owned.....	— 0 —
15,000 "	Standard Oil Co. (New Jersey) Cap. (Par \$15) received as a dividend on 600,000 shares Standard Oil Co. (Indiana) Cap. (Par \$25). Taken into the books at \$68.15 per share in accordance with notice received from Standard Oil Co. (Indiana) dated Sept. 21, 1951, and the value credited to income.....	1,022,250.00
		<hr/>
		\$1,022,250.00
		<hr/>

RECEIVED IN EXCHANGE AND BY STOCK SPLIT

\$3,000,000	USA Treasury Certificates of Indebtedness 1½% 4, 1, 52 for \$3,000,000 USA Treasury Notes "D" 1¼% 7/1/51	\$2,998,894 83
75,000 Shares	Continental Oil Co. (Delaware) Cap. (Par \$5) received on account of ownership of 75,000 shares of said stock on a share for share basis. Taken into the books at no value thereby reducing the per share price of stock owned.	-- 0 --
10,000 "	Houston Lighting & Power Co. Com. (No par) received on account of ownership of 5,000 shares of said stock of record April 18, 1951. Taken into the books at no value thereby reducing the per share price of stock owned.	-- 0 --
67,300 "	Standard Oil Co. of California Cap. (No par) representing additional shares received on account of ownership of 67,300 shares of said stock which was split on a two for one basis. Taken into the books at no value thereby reducing the per share price of stock owned.	-- 0 --
2,066,000 "	Standard Oil Co. (New Jersey) Cap. (Par \$15) received upon surrender of 1,033,000 shares Standard Oil Co. (New Jersey) Cap. (Par \$25). Taken into the books at no value thereby reducing the per share price of stock owned.	-- 0 --
		\$2,998,894 83

TREASURER'S REPORT

OTHERWISE ACQUIRED

15,000 Rights	American Gas & Electric Co. received on account of the ownership of 15,000 shares American Gas & Electric Co. Com. Stock (Par \$10). Taken into the books at \$5.717 per 100 and the value used to reduce the ledger value of stock owned.	\$857 48
30,000 "	American Telephone & Telegraph Co. received on account of the ownership of 30,000 shares American Telephone & Telegraph Co. Cap. Stock (Par \$100). Taken into the books at \$1.84375 each and the value used to reduce the ledger value of stock owned.	55,312.50

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TRANSACTIONS RELATING TO INVESTED FUNDS — *Continued*

20,000 Rights	Central Illinois Public Service Co., received on account of the ownership of 20,000 shares Central Illinois Public Service Co. Com. Stock (Par \$10). Taken into the books at \$4.45 per 1,000 and the value used to reduce the ledger value of stock owned	\$89.00
4,000 "	Dow Chemical Co. received on account of the ownership of 4,000 shares Dow Chemical Co. Com. Stock (Par \$15). Taken into the books at \$38.609 per 100 and the value used to reduce the ledger value of stock owned	1,544.36
1,043-478/1000 Shares	Monsanto Chemical Co. Com. (Par \$5), received through the conversion of 600 shares Monsanto Chemical Co. \$4.00 Cum. Pfc. Series "B" (No par), having a value of \$101.00 per share or \$60,600.00 and resulting in a price of \$58.75 per share for the common stock	60,600.00
10,000 Rights	Wisconsin Power & Light Co. received on account of ownership of 10,000 shares Wisconsin Power & Light Co. Com. Stock (Par \$10). Taken into the books at \$4.65 per 1,000 and the value used to reduce the ledger value of stock owned	46.50
		\$118,449.84

ADDITIONS TO LEDGER VALUE

Interest increment on USA Savings Bonds, Series F (12 year appreciation bonds)		
\$67,500 (Maturity value) due May 1, 1953		\$2,092.50
67,500 (Maturity value) due Jan. 1, 1954		1,822.50
67,500 (Maturity value) due July 1, 1954		1,755.00
135,000 (Maturity value) due Jan. 1, 1955		3,510.00
		\$9,180.00
		\$22,189,398.03

SOLD		TOTAL PROCEEDS	LEDGER VALUE
£153,500	Imperial Chinese Government HuKuang Ry. S.F. Loan of 1911 5s/75 @ \$14.375 per £100.	\$22,065.62	\$
15,000 Rights	American Gas & Electric Co. @ \$5.7165 per 100.	857.48	857.48
30,000 "	American Telephone & Telegraph Co. @ \$1.84375 each.	55,312.50	55,312.50
12,500 Shares	American Telephone & Telegraph Co. Cap. (Par \$100) @ \$156.25.	1,953,125.82	1,777,477.43
20,000 "	Central Illinois Public Service Co. Com. (Par \$10) @ \$16.4069 per share.	328,138.00	239,837.01
20,000 Rights	Central Illinois Public Service Co. @ \$4.45 per 1,000.	89.00	89.00
49,300 Shares	Central & South West Corporation Com. (Par \$5) @ \$13.878 per share.	677,092.04	462,575.77
4,000 Rights	Dow Chemical Co. @ \$38.609 per 100.	1,544.36	1,544.36
500 Shares	El Paso Natural Gas Co. Com. (Par \$3) @ \$23.613 per share.	11,806.66	6,320.56
15,000 "	Houston Lighting & Power Co. Com. (No par) @ \$18.401 per share.	276,017.13	239,362.74
7,000 "	Illinois Power Co. Com. (No par) @ \$36.023 per share.	252,158.14	264,198.59
4,000 "	International Harvester Co. Cum. Pfd. (Par \$100) @ \$164.279 per share.	657,117.62	460,000.00
1,500 "	International Nickel Co. of Canada, Ltd. Com. (No par) @ \$38.687 per share.	58,030.67	61,226.75
20,000 "	Kentucky Utilities Co. Com. (Par \$10) @ \$14.665 per share.	293,300.00	205,410.00
478/1000ths of one share	Monsanto Chemical Co. Com. (Par \$5) @ \$57.50 per share.	27.49	27.76
12,000 Shares	The North American Co. Com. (Par \$10) @ \$17.846 per share.	214,153.73	230,453.24
306,000 "	Standard Oil Co. (Ohio) Com. (Par \$10) @ \$39.0005 per share.	11,934,164.58	2,644,944.35
5,000 "	Texas Gulf Sulphur Co. Cap. (No par) @ \$101.056 per share.	505,282.06	409,420.12
10,000 "	Wisconsin Power & Light Co. Com. (Par \$10) @ \$16.215.	162,150.00	134,119.31
10,000 Rights	Wisconsin Power & Light Co. \$4.65 per 1000.	46.50	46.50
		<u>\$17,402,479.40</u>	<u>\$7,193,223.47</u>

TREASURER'S REPORT

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TRANSACTIONS RELATING TO INVESTED FUNDS — *Continued*

	TOTAL PROCEEDS	LEDGER VALUE
SURRENDERED IN EXCHANGE AND FOR CONVERSION		
\$3,000,000 USA Treasury Notes Series "D" 1¼s 7/1/51 for USA Treasury Certificates of Indebtedness 1⅞s 4/1/52	\$2,998,894 83	\$2,998,894 83
600 Shares — Monsanto Chemical Co. \$4.00 Cum. Pfc. Series "B" (No par) surrendered for conversion into 1,043-478/1000 shares Monsanto Chemical Co. Com. (Par \$5)	60,600 00	60,600 00
1,033,000 Shares — Standard Oil Co. (New Jersey) Cap. (Par \$25) exchanged for 2,066,000 shares Standard Oil Co. (New Jersey) Cap. (Par \$15) .. .. .	.....	.. .. .
	<u>\$3,059,494 83</u>	<u>\$3,059,494 83</u>
LEDGER VALUE REDUCED		
Ledger value of 15,000 shares American Gas & Electric Co. Com. (Par \$10) reduced by the value of 15,000 rights which were received on account of the ownership thereof	\$857.48	\$857.48
Ledger value of 30,000 shares American Telephone & Telegraph Co. Cap. (Par \$100) reduced by the value of 30,000 rights which were received on account of the ownership thereof. . . .	55,312 50	55,312 50
Ledger value of 20,000 shares Central Illinois Public Service Co. Com. (Par \$10) reduced by the value of 20,000 rights which were received on account of the ownership thereof. . . .	89.00	89.00
Ledger value of 4,000 shares Dow Chemical Co. Com. (Par \$15) reduced by the value of 4,000 rights which were received on account of the ownership thereof	1,544.36	1,544 36
Ledger value of 10,000 shares Wisconsin Power & Light Co. Com. (Par \$10) reduced by the value of 10,000 rights which were received on account of the ownership thereof	46 50	46 50
	<u>\$57,849.84</u>	<u>\$57,849 84</u>

	MARKET VALUE	LEDGER VALUE
PAYMENT OF APPROPRIATION TO GENERAL EDUCATION BOARD		
Transfer of 59,000 shares of Standard Oil Co. of California Cap. (No par) @ \$50.875	\$3,001,625 00	\$462,587 33
	<u>\$23,521,449 07</u>	<u>\$10,776,497 27</u>

AMORTIZATION OF PREMIUM PAID ON PURCHASES OF SECURITIES		
\$6,200,000 USA Treasury Bonds 2 ¹ / ₄ s, 1959-62.		\$2,688 68
6,500,000 USA Treasury Bonds 2 ¹ / ₈ s, 1967-72		653 12
		<u>\$3,341 80</u>

RECONCILIATION

Ledger value of securities, December 31, 1950		\$152,241,857.35
Purchased	\$18,040,623 36	
Dividends in stock	1,022,250 00	
Received in exchange and by stock split	2,998,894.83	
Otherwise acquired	118,449 84	
Additions to ledger value	9,180.00	22,189,398 03
		<u>\$174,431,255 38</u>
Sold	\$7,193,223.47	
Surrendered in exchange and for conversion	3,059,494 83	
Ledger value reduced	57,849.84	
Payment of Appropriation	462,587.33	
Amortization	3,341.80	10,776,497.27
		<u>\$163,654,758.11</u>
Ledger value of securities, December 31, 1951		\$163,654,758.11

TREASURER'S REPORT

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SCHEDULE OF SECURITIES ON DECEMBER 31, 1951
BONDS

NAME	PAR	LEDGER VALUE		MARKET VALUE	
		PRICE	TOTAL	PRICE	TOTAL
Chesapeake & Ohio Ry. 2nd Equipment Trust					
2 ⁷ / ₈ s, May 15, 1952.....	\$100,000	100.587	\$100,586.98	100.	\$100,000.00
2 ⁷ / ₈ s, Nov. 15, 1952.....	125,000	100.746	125,932.89	100.125	125,156.25
2 ⁷ / ₈ s, May 15, 1953.....	100,000	100.806	100,806.05	100.125	100,125.00
Chicago, Milwaukee, St. Paul & Pacific R.R., Trustees Equipment, Series EE 2s, July 1, 1953.....	125,000	99.175	123,968.81	98.75	123,437.50
Chicago & North Western Ry. Equipment, 2nd issue 1948, 2⁷/₈s, Nov. 1, 1953.....	225,000	99.466	223,799.51	99.00	222,750.00
Illinois Central R.R. Equipment, Series EE					
2 ⁷ / ₈ s, Apr. 1, 1952.....	175,000	100.452	175,790.96	100.	175,000.00
2 ⁷ / ₈ s, Oct. 1, 1952.....	200,000	100.57	201,141.56	100.125	200,250.00
2 ⁷ / ₈ s, Apr. 1, 1953.....	200,000	100.59	201,181.19	100.	200,000.00
Illinois Central R.R. Equipment, Series U					
3s, May 1, 1952.....	100,000	100.566	100,566.12	100.	100,000.00
3s, Nov. 1, 1952.....	100,000	100.712	100,712.39	100.25	100,250.00
St. Louis, San Francisco Ry. Equipment, Series B, 2⁵/₈s, Aug. 15, 1952.....	100,000	100.334	100,334.16	100.	100,000.00
Southern Pacific Co. Equipment, Series EE, 2⁷/₈s, Apr. 1, 1953	350,000	100.957	353,350.89	100.125	350,437.50

Standard Oil Co. (New Jersey) 25 year Deb. 2 $\frac{7}{8}$ s, May 15, 1971.....	\$8,500,000	98.	\$8,329,995.00	90.625	\$7,703,125.00
United States of America Treasury Bonds					
<i>Int.</i> <i>Dated</i> <i>Due</i>					
2% — Sept. 15, 1943 — Sept. 15, 1952-53.....	5,000,000	100.	5,000,000.00	99.875	4,993,750.00
2% — June 26, 1944 — June 15, 1952-54.....	4,500,000	100.	4,500,000.00	99.5625	4,480,312.50
2% — Dec. 1, 1944 — Dec. 15, 1952-54.....	6,600,000	100.	6,600,000.00	99.4375	6,562,875.00
2 $\frac{1}{4}$ % — June 1, 1945 — June 15, 1959-62.....	7,000,000	100.	7,000,000.00	96.8125	6,776,875.00
2 $\frac{1}{4}$ % — Nov. 15, 1945 — Dec. 15, 1959-62.....	6,200,000	100.34	6,221,509.38	96.6875	5,994,625.00
2 $\frac{1}{4}$ % — May 5, 1942 — June 15, 1962-67.....	6,000,000	100.	6,000,000.00	98.	5,880,000.00
2 $\frac{1}{4}$ % — June 1, 1945 — June 15, 1967-72.....	6,500,000	100.156	6,510,122.63	96.125	6,248,125.00
2 $\frac{1}{8}$ % — Nov. 15, 1945 — Dec. 15, 1967-72.....	6,000,000	100.	6,000,000.00	96.125	5,767,500.00
United States of America Treasury Certificates of Indebtedness 1$\frac{3}{8}$%					
Dated June 15, 1951, due Apr. 1, 1952.....	3,000,000	99.963	2,998,894.83	100.001	3,000,030.00
Dated Oct. 15, 1951, due Oct. 1, 1952.....	1,000,000	100.096	1,000,967.63	99.998	999,980.00
United States of America Savings Bonds					
Defense Series F (12 year appreciation bonds)					
Due May 1, 1953 — Maturity value.....	67,500	94.50	63,787.50	94.50	63,787.50
Jan. 1, 1954 — Maturity value.....	67,500	91.4	61,695.00	91.4	61,695.00
July 1, 1954 — Maturity value.....	67,500	90.	60,750.00	90.	60,750.00
Jan. 1, 1955 — Maturity value.....	135,000	88.7	119,745.00	88.7	119,745.00

SCHEDULE OF SECURITIES — *Continued*

BONDS — *Continued*

NAME	PAR	LEDGER VALUE		MARKET VALUE	
		PRICE	TOTAL	PRICE	TOTAL
United States of America Savings Bonds 2½%, Series G, dated Oct. 1, 1950, due Oct. 1, 1962.....	\$1,000,000	100.	\$1,000,000.00	97.80	\$978,000.00
Wheeling & Lake Erie Ry. Equipment Series O, 1½%, Dec. 1, 1953.....	100,000	98.834	98,834.32	98.50	98,500.00
TOTAL BONDS.....	.....	..	\$63,474,472.80	..	\$61,687,081.25

PREFERRED STOCKS

NAME	SHARES	LEDGER VALUE		MARKET VALUE	
		PRICE	TOTAL	PRICE	TOTAL
Chicago City & Connecting Rys. Participation Certificates (No par) (C/D).....	17,530	\$—0—	\$1.00	\$—0—	\$—0—
Tennessee Gas Transmission Co. 4.25% Cum. (Par \$100)	5,000	96.675	483,372.50	84.00	420,000.00
United States Rubber Co. 8% Non-Cum. 1st (Par \$100)	1,500	150.892	226,337.50	136.25	204,375.00
TOTAL PREFERRED STOCKS.....	.....	.....	\$709,711.00	.....	\$624,375.00

COMMON STOCKS

NAME	SHARES	LEDGER VALUE		MARKET VALUE	
		PRICE	TOTAL	PRICE	TOTAL
<i>Miscellaneous</i>					
Aluminum Company of America (No par)	8,000	\$52 219	\$417,757 05	\$79 75	\$638,000.00
Aluminum Limited, Cap. (No par)	5,000	99 77	498,859 53	106.00	530,000.00
American Gas & Electric Co. (Par \$10)	15,750	51 433	810,074 11	60 125	946,968 75
American Telephone & Telegraph Co. Cap. (Par \$100)	20,000	141 829	2,836,588 88	156.25	3,125,000 00
The Buckeye Pipe Line Co. Cap. (No par)	107,763	11 791	1,270,627 60	13.875	1,495,211 62
Canadian Pacific Ry. Co. Ord. (Par \$25)	10,000	33 579	335,790 70	35.375	353,750 00
Chicago City & Connecting Rys. Participation Certificates (No par)	10,518	-0-	1 00	-0-	-0-
Consolidated Natural Gas Co. Cap. (Par \$15)	133,174	29.132	3,879,682 67	58.00	7,724,092 00
Continental Insurance Co. Cap. (Par \$10)	10,000	65.597	655,965.37	72.00	720,000 00
Continental Oil Co. (Delaware) Cap. (Par \$5)	150,000	14.46	2,169,117.65	56 25	8,437,500 00
Dow Chemical Co. (Par \$15)	4,100	53 296	218,514 48	116 00	475,600 00
Du Pont, (E. I.) de Nemours & Co. (Par \$5)	4,000	61.612	246,447.68	92.00	368,000 00
Fireman's Fund Insurance Co. Cap. (Par \$5)	10,000	57 67	576,708.97	55 00	550,000 00
First National Bank of Chicago (Par \$100)	6,000	193 229	1,159,379 35	212.00	1,272,000.00
General Electric Co. Com. (No par)	9,400	58.433	549,277.85	59.50	559,300.00
General Mills, Inc. (No par)	4,000	55 515	222,060 92	57 50	230,000 00
Hartford Fire Insurance Co. Cap. (Par \$10)	15,000	130 075	1,951,131.15	130.50	1,957,500.00
International Nickel Co. of Canada, Ltd. (No par)	52,500	40.818	2,142,936.29	42 25	2,218,125 00
International Paper Co. (Par \$7.50)	50,000	41 685	2,084,257.31	49.00	2,450,000.00
Interstate Natural Gas Co. Inc. Cap. (No par)	33,765	14.959	505,106.25	34.25	1,156,451.25
Kennecott Copper Corporation Cap. (No par)	35,100	58.539	2,054,731 03	85 75	3,009,825 00

TREASURER'S REPORT

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SCHEDULE OF SECURITIES — *Concluded*
COMMON STOCKS — *Concluded*

NAME	SHARES	LEDGER VALUE		MARKET VALUE	
		PRICE	TOTAL	PRICE	TOTAL
Monsanto Chemical Co. (Par \$5)	6,043	\$69 947	\$422,687 85	\$105 75	\$639,047 25
Montgomery Ward & Co. Inc. (No par)	4,000	55 834	223,337 11	67.50	270,000 00
National Fuel Gas Co. Cap. (No par)	381,018	7 75	2,952,889 50	13 75	5,238,997 50
The Ohio Oil Co. (No par)	94,684	32 735	3,099,446.50	54.75	5,183,949 00
Peoples Gas Light & Coke Co. (Par \$100)	6,000	125 076	750,453 34	130	780,000 00
Phelps Dodge Corporation Cap. (Par \$25)	37,600	52 717	1,982,151 40	77.75	2,923,400 00
Socony Vacuum Oil Co. (Par \$15)	300,000	33 306	9,992,003 35	35.125	10,537,500 00
Standard Oil Co. of California Cap. (No par)	75,600	7 84	592,739 03	50 875	3,846,150 00
Standard Oil Co. (Indiana) Cap. (Par \$25)	600,000	28 901	17,340,411 26	74 75	44,850,000 00
Standard Oil Co. (New Jersey) Cap. (Par \$15)	2,081,000	15 029	31,275,399 51	75.75	157,635,750 00
Texas Gulf Sulphur Co. Cap. (No par)	20,000	81 884	1,637,680 51	100 125	2,002,500 00
Union Pacific R.R. Co. Com. (Par \$50)	5,000	103 94	519,705 54	100.	500,000 00
Union Tank Car Co. Cap. (No par)	240,000	6 692	1,606,087 97	38.25	9,180,000 00
United Fruit Co. Cap. (No par)	15,000	57.965	869,477 29	63.625	954,375 00
Weyerhaeuser Timber Co. Cap. (Par \$25)	30,000	54 036	1,621,088 31	72 50	2,175,000 00
TOTAL COMMON STOCKS			\$99,470,574 31		\$284,933,992 37

SUMMARY		LEDGER VALUE	MARKET VALUE
Bonds		\$63,474,472.80	\$61,687,081.25
Preferred Stocks		709,711.00	624,375.00
Common Stocks		99,470,574.31	284,933,992.37
		\$163,654,758 11	\$347,245,448.62

HASKINS & SELLS

CERTIFIED PUBLIC ACCOUNTANTS

250 PARK AVENUE, NEW YORK 17

ACCOUNTANTS' CERTIFICATE

TO THE BOARD OF TRUSTEES OF
THE ROCKEFELLER FOUNDATION:

We have examined the balance sheet of The Rockefeller Foundation as of December 31, 1951 and the related statements of Principal Fund and Funds Available for Commitment for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In accordance with the policy of the Foundation, no effect has been given in the accompanying statements to accrued income not received, nor to expenditures made from advance accounts not reported in time to be recorded when the books were closed, as of December 31, 1951.

In our opinion, with the foregoing explanation the accompanying balance sheet and statements of Principal Fund and Funds Available for Commitment present fairly the financial position of the Foundation at December 31, 1951 and the results of its operations for the year then ended, in conformity with generally accepted accounting principles.

HASKINS & SELLS

New York, March 17, 1952

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