The Rockefeller Foundation

Annual Report

1928

The Rockefeller Foundation
61 Broadway, New York

CONTENTS

ILLUSTRATIONS

THE ROCKEFELLER FOUNDATION

OFFICERS, MEMBERS, AND COMMITTEES

1928

Members

JOHN G. AGAR[1]
JAMES R. ANGELL[2]
TREVOR ARNETT[2]
JOHN W. DAVIS
DAVID L. EDSALL
SIMON FLEXNER
RAYMOND B. FOSDICK
JEROME D. GREENE[3]
ERNEST M. HOPKINS[2]
CHARLES P. HOWLAND[2]
CHARLES E. HUGHES[1]
VERNON KELLOGG
JOHN D. ROCKEFELLER, JR.
WICKLIFFE ROSE[1]
JULIUS ROSENWALD
MARTIN A. RYERSON[1]
ANSON PHELPS STOKES[3]
FREDERICK STRAUSS
AUGUSTUS TROWBRIDGE[2]
GEORGE E. VINCENT
GEORGE H. WHIPPLE
WILLIAM ALLEN WHITE
RAY LYMAN WILBUR
ARTHUR WOODS[3]
OWEN D. YOUNG[3]

Executive Committee

THE PRESIDENT, *Chairman*

JOHN G. AGAR[1]
TREVOR ARNETT[2]
DAVID L. EDSALL[3]
SIMON FLEXNER
RAYMOND B. FOSDICK
JEROME D. GREENE[3]
CHARLES P. HOWLAND[2]
VERNON KELLOGG
WICKLIFFE ROSE[1]
FREDERICK STRAUSS
ARTHUR WOODS[2]
NORMA S. THOMPSON, *Secretary*

Finance Committee

JOHN D. ROCKEFELLER, JR., *Chairman*

RAYMOND B. FOSDICK
FREDERICK STRAUSS

Divisional Committee
International Health Division

THE PRESIDENT, *Chairman*

SIMON FLEXNER
RAYMOND B. FOSDICK
VERNON KELLOGG
WICKLIFFE ROSE[1]
WILLIAM ALLEN WHITE

Divisional Committee
Division of Medical Education

THE PRESIDENT, *Chairman*

JOHN G. AGAR[1]
DAVID L. EDSALL
CHARLES P. HOWLAND[2]
FREDERICK STRAUSS
GEORGE H. WHIPPLE

Officers

Chairman of the Board of Trustees
JOHN D. ROCKEFELLER, JR.
President
GEORGE E. VINCENT
Vice-President in Europe
SELSKAR M. GUNN
Vice-President in the Far East
ROGER S. GREENE
Director, International Health Division
FREDERICK F. RUSSELL, M.D.
Director, Division of Medical Education
RICHARD M. PEARCE, M.D.
Director for the Social Sciences
EDMUND E. DAY[4]
Director for the Natural Sciences
MAX MASON[4]
Secretary
NORMA S. THOMPSON
Treasurer
LOUIS GUERINEAU MYERS
Comptroller
GEORGE J. BEAL

---

[1] Resigned during 1928
[2] Elected November 9, 1928
[3] Elected June 30, 1928
[4] Elected October 1, 1928

THE ROCKEFELLER FOUNDATION

OFFICERS, MEMBERS, AND COMMITTEES
1929

Members

JAMES R. ANGELL
TREVOR ARNETT
JOHN W. DAVIS
DAVID L. EDSALL
SIMON FLEXNER
RAYMOND B. FOSDICK
JEROME D. GREENE
ERNEST M. HOPKINS
CHARLES P. HOWLAND
VERNON KELLOGG
JOHN D. ROCKEFELLER, JR.
JULIUS ROSENWALD
ANSON PHELPS STOKES
FREDERICK STRAUSS
AUGUSTUS TROWBRIDGE
GEORGE E. VINCENT
GEORGE H. WHIPPLE
WILLIAM ALLEN WHITE
RAY LYMAN WILBUR
ARTHUR WOODS
OWEN D. YOUNG

Executive Committee

THE PRESIDENT, *Chairman*

TREVOR ARNETT
DAVID L. EDSALL
SIMON FLEXNER
RAYMOND B. FOSDICK
JEROME D. GREENE
CHARLES P. HOWLAND
VERNON KELLOGG
ARTHUR WOODS
NORMA S. THOMPSON, *Secretary*

Finance Committee

JOHN D. ROCKEFELLER, JR., *Chairman*

RAYMOND B. FOSDICK
FREDERICK STRAUSS

International Health Division

Scientific Directors

RUFUS COLE, M.D., *Chairman*

EUGENE L. BISHOP, M.D.
LOUIS I. DUBLIN
WADE H. FROST, M.D.
WILSON G. SMILLIE, M.D.
C.-E. A. WINSLOW, D.P.H.
FREDERICK F. RUSSELL, M.D., *Secretary*

Officers

Chairman of the Board of Trustees
JOHN D. ROCKEFELLER, JR.

President
GEORGE E. VINCENT

Vice-President in New York Office
THOMAS B. APPLEGET

Vice-President in Europe
SELSKAR M. GUNN

Vice-President in the Far East
ROGER S. GREENE[1]

Director for the Humanities
EDWARD CAPPS

Director for the Social Sciences
EDMUND E. DAY

Director for the Natural Sciences
MAX MASON

Director for the Medical Sciences
RICHARD M. PEARCE, M.D.

Director, International Health Division
FREDERICK F. RUSSELL, M.D.

Secretary
NORMA S. THOMPSON

Treasurer
LOUIS GUERINEAU MYERS

Comptroller
GEORGE J. BEAL

---

[1] Resigned June 1, 1929

To the Members of the Rockefeller Foundation:
Gentlemen:

I have the honor to transmit herewith the detailed reports for the period January 1, 1928, to December 31, 1928, of the Secretary and the Treasurer of the Foundation, the Director of the International Health Division, and the Director of the Division of Medical Education.

A summary review of the work of the Foundation for the year 1928, prepared by the President, was issued in June 1928, and widely distributed in both English and French editions.[1]

During 1928 a conference committee of four Rockefeller boards, namely, the General Education Board, the Rockefeller Foundation, the Laura Spelman Rockefeller Memorial, and the International Education Board, sought ways of bringing the work of these organizations into closer and more definitely cooperative relations. In the autumn the committee made a report embodying recommendations which were approved by all the groups, with the understanding that the new régime would go into effect at the beginning of 1929.

[1] Copies of these publications may be secured without charge on application to the Rockefeller Foundation, 61 Broadway, New York.

The essential features of the reorganization were these: (1) the merging of the Rockefeller Foundation and the Laura Spelman Rockefeller Memorial into a new corporation to be known as the Rockefeller Foundation, which should assume all the assets and liabilities of the two boards; (2) the extension of the scope of the new Foundation's activities to include not only public health, but the advancement of knowledge in the medical sciences, in the natural sciences (taking over the foreign program of the International Education Board), in the social sciences (heretofore administered by the Laura Spelman Rockefeller Memorial), and in the humanities; (3) the administration of the public health activities of the Foundation through an International Health Division with a group of seven scientific directors; (4) the appointment of a director with necessary assistants for each of the fields—the natural sciences, the medical sciences, the social sciences, and the humanities; (5) a clearly defined division of labor between the General Education Board and the Foundation through frequent conferences of the officers; (6) the incorporation of a China Medical Board, with independent self-perpetuating trustees, to which the lands and buildings in Peking, together with endowment funds and annual appropriations, should be given.

With deep regret I report two deaths during 1928, that of Dr. Hideyo Noguchi, a member of the original staff of the Rockefeller Institute for Medical Research, at the time of his death serving on the staff of the Rockefeller Foundation's Yellow Fever Commission in West Africa, and that of Dr. W. A. Young, director of the British Medical Research Institute at Accra, Gold Coast, who welcomed Dr. Noguchi to this institution and cooperated with him.

Respectfully yours,

GEORGE E. VINCENT

President

DR. HIDEYO NOGUCHI

Dr. Hideyo Noguchi, of the Rockefeller Institute for Medical Research, died at Accra, West Africa, on May 21, 1928, a victim of yellow fever contracted while investigating the relation between South American and African yellow fever.

Dr. Noguchi was born on November 24, 1876, at Inawashiro, Japan. He studied medicine at the Tokyo Medical College, receiving the license to practise medicine from the Japanese Government in 1897. From 1898 to 1900 he was assistant in the Government Institute for Infectious Diseases at Tokyo, and during this period also held a lectureship in bacteriology at the Tokyo Dental College. Dr. Noguchi came to the United States in 1900 and joined the pathological staff of the University of Pennsylvania, under Dr. Simon Flexner. He remained here for three years, during which time he was designated research assistant of the Carnegie Institution of Washington. He then continued his studies at the State Serum Institute in Copenhagen, under Dr. Madsen. At the founding of the laboratories of the Rockefeller Institute in New York, in 1904, Dr. Noguchi became a member of the original staff and one of the original members of the Institute. This title he held at the time of his death.

Dr. Noguchi was the recipient of many honors and honorary degrees, among them the medal of the Society of Japanese, in 1924, as one of the ten greatest Japanese. He was also a member of many scientific societies in the United States and in foreign countries.

Dr. Noguchi was a distinguished bacteriologist and was ranked among the most eminent of all time in that field. His earlier scientific work was on the biology of venoms and antivenins. Later he studied with extraordinary success the bacteriology of the spirochetes, a number of which he cultivated artificially for the first time. He was the first to demonstrate *Treponema pallidum* in the brain of paretics. In 1915 he first cultivated a bacteria-free vaccine virus in the tissues of rabbits, an accomplishment of great practical value in providing a pure virus for purposes of vaccination. In 1918 Dr. Noguchi served on the Yellow Fever Commission sent by the International Health Board of the Rockefeller Foundation to Guayaquil, Ecuador.

In recent years Dr. Noguchi isolated the microorganism, *Bartonella bacilliformis*, from the blood of fatal cases of Carrion's disease and verruga peruana, an achievement which settled the long disputed question of the relation of Carrion's disease to verruga. During 1926 he cultivated from the eyes of American Indians suffering from trachoma, a bacillus which reproduces trachoma in rhesus monkeys and chimpanzees, thus solving the problem of the nature of trachoma.

In the death of Dr. Noguchi bacteriological science has lost one of its most brilliant investigators and the Rockefeller Institute one of its most eminent scientific workers and most charming and deeply respected members.

THE ROCKEFELLER FOUNDATION

Report of the Secretary

To the President of the Rockefeller Foundation:
Sir:

I have the honor to submit herewith my report for the period January 1, 1928, to December 31, 1928.

Respectfully yours,
NORMA S. THOMPSON
Secretary

SECRETARY'S REPORT

The following were members and trustees of the Rockefeller Foundation during 1928:

John G. Agar
John W. Davis
David L. Edsall
Simon Flexner
Raymond B. Fosdick
Charles E. Hughes
Vernon Kellogg
John D. Rockefeller, Jr.
Wickliffe Rose
Julius Rosenwald
Martin A. Ryerson
Frederick Strauss
George E. Vincent
George H. Whipple
William Allen White
Ray Lyman Wilbur

In addition, the following were elected members and trustees at the meeting held in November 1928:

James R. Angell
Trevor Arnett
Jerome D. Greene
Ernest M. Hopkins
Charles P. Howland
Anson Phelps Stokes
Augustus Trowbridge
Arthur Woods
Owen D. Young

Mr. Agar, Mr. Hughes, Mr. Rose, and Mr. Ryerson retired during the year.

The following were members of the executive and divisional committees during 1928:

EXECUTIVE COMMITTEE

The President, *Chairman*

John G. Agar
David L. Edsall
Simon Flexner
Raymond B. Fosdick
Vernon Kellogg
Wickliffe Rose
Frederick Strauss
Norma S. Thompson, *Secretary*

In addition, the following were elected members at the meeting held in November 1928:

Trevor Arnett
Jerome D. Greene
Charles P. Howland
Arthur Woods

DIVISIONAL COMMITTEE

INTERNATIONAL HEALTH DIVISION

The President, *Chairman*

Simon Flexner
Raymond B. Fosdick
Vernon Kellogg
Wickliffe Rose
William Allen White

DIVISIONAL COMMITTEE

DIVISION OF MEDICAL EDUCATION

The President, *Chairman*

John G. Agar
David L. Edsall
Frederick Strauss
George H. Whipple

In addition, Mr. Charles P. Howland was elected at the meeting held in November 1928.

Officers of the Foundation during 1928 were:

John D. Rockefeller, Jr.	*Chairman, Board of Trustees*
George E. Vincent	*President*
Roger S. Greene	*Vice-President in the Far East*
Selskar M. Gunn	*Vice-President in Europe*
Frederick F. Russell, M.D.	*Director, International Health Division*
Richard M. Pearce, M.D.	*Director, Division of Medical Education*
Max Mason	*Director for the Natural Sciences*[1]
Edmund E. Day	*Director for the Social Sciences*[1]
Norma S. Thompson	*Secretary*
Louis G. Myers	*Treasurer*
George J. Beal	*Comptroller*

Meetings

Regular meetings of the Rockefeller Foundation were held on May 23 and November 9, 1928.

[1] Elected October 1, 1928

Twelve meetings of the Executive Committee were held during the intervals between the regular meetings to execute programs within general policies approved by the trustees. A special meeting of the Board of Trustees was held on March 15, 1928.

Financial Summary

In the following financial statement is presented a summary of receipts and disbursements of the Foundation in 1928. The table outlines in expenditures the work described in terms of aims and results in the main body of the report. In many instances payments involved sums appropriated in former years. On the other hand, in some cases payments represent but a portion of appropriations made during 1928, remainders of which will be paid during succeeding years.

STATEMENT OF RECEIPTS AND DISBURSEMENTS IN 1928

Receipts		*Disbursements*	
Balance from 1927 (including refunds during 1928 on prior year appropriations)	$7,260,242	Public Health	$3,042,339
Income during 1928.	9,175,550	Medical Education	17,266,153
Set aside from principal funds in accordance with resolution of the Members, as of November 9, 1928.	12,000,000	Miscellaneous	781,888
		Administration	600,358
		Balance:	
		Payable on 1928 and prior appropriations $5,057,633	
		Available for 1929 appropriations 1,687,421	6,745,054
	$28,435,792		$28,435,792

SUMMARY OF EXPENDITURES IN 1928

I. PUBLIC HEALTH

1. Regular program in control of hookworm infection, malaria, yellow fever, and in county health work; aid to state health services and bureaus for study and reform of health activities.....	$1,925,805.64
2. Health Organization of the League of Nations...	110,218.60
3. Public health education	
(a) Fellowships.....	226,133.33
(b) Study and training courses and travel of visiting officials.....	61,448.09
(c) Schools and institutes of hygiene and public health	
Maintenance	
(1) London School of Hygiene and Tropical Medicine.....	19,479.52
(2) Central Medical School for Native Medical Students, Fiji.....	17,291.22
(3) University of Zagreb, Yugoslavia..	5,000.00
(4) State Hygienic Institute, Budapest, Hungary.....	3,680.00
(5) Institute of Hygiene, São Paulo, Brazil.....	14.00
(6) Harvard Medical School.....	8,500.00
Buildings, equipment, or endowment	
(1) State Institute of Public Health, Prague, Czechoslovakia.....	189,212.08
(2) State Hygienic Institute, Budapest, Hungary.....	48,648.49
(3) Institute of Hygiene, São Paulo, Brazil.....	117,459.85
(4) School of Hygiene, University of Toronto.....	250,000.00
(5) School of Public Health, Harvard University.....	49,500.00
(6) Imperial College of Tropical Agriculture, Trinidad, British West Indies.....	4,890.00
(7) Central Medical School for Native Medical Students, Fiji.....	4,860.00
(d) D. Anna Nery School of Nursing, Rio de Janeiro, Brazil.....	198.34
	$3,042,339.16

II. MEDICAL EDUCATION

1. Medical institutions

Maintenance	
(a) Peking Union Medical College	$776,293.57
(b) Institutions in China other than Peking Union Medical College	33,582.02
(c) Central Europe: journals and apparatus.	114,098.43
(d) American University of Beirut	40,000.00
(e) Chulalongkorn University, Siam	22,750.28
(f) University of Edinburgh	7,710.50
(g) Dalhousie University, Canada	2,000.00
Buildings, equipment, or endowment	
(a) Free University of Brussels	1,539,236.94
(b) Peking Union Medical College	343,451.41
(c) Faculty of Medicine, São Paulo, Brazil	732,818.42
(d) University of Montreal	25,000.00
(e) University of Cambridge	22,368.94
(f) University of Lyon, France	269,581.73
(g) University of Strasbourg, France	3,936.88
(h) Institute for Psychiatric Research, Munich, Germany	75,000.00
(i) National School of Medicine and Pharmacy, Port au Prince, Haiti	15,000.00
(j) Keio University College of Medicine, Japan	100,000.00
(k) Chulalongkorn University	4,570.20
(l) New York Academy of Medicine	622,500.00
(m) China Medical Board, Inc.	12,000,000.00
2. Premedical schools	69,359.96
3. Hospitals	30,756.21
4. Fellowships and scholarships	289,321.30
5. Visiting commissions and professors, surveys, and publications	31,403.30
6. American Medical Association: towards publishing a Spanish edition of its Journal	5,450.23
7. Commission on Medical Education: towards study of medical curriculum in America	10,000.00
8. Field service: salaries and expenses	79,962.89
	$17,266,153.21

III. MISCELLANEOUS

1. Biology

(a) Mental hygiene	$43,173.07

(b) National Research Council	
Research fellowships in biological sciences	$66,647.24
Biological Abstracts	57,078.74
(c) The Johns Hopkins University	
Biological research	47,000.00
(d) Yale University	
Promotion of anthropoid research	10,000.00
(e) Fellowships	8,811.39
(f) Australian National Research Council	
Anthropological studies	26,029.05
Fellowships in anthropology	3,672.97
(g) University of Hawaii	
Study of race biology	20,000.00
(h) Bernice P. Bishop Museum, Honolulu	
Research in Polynesian anthropology	8,700.00
(i) Tohoku Imperial University, Japan	
Visiting professors	7,748.27
2. Nursing education	258,405.35
3. Fellowships in physics, chemistry, and mathematics	105,416.79
4. Hospital and dispensary service	62,966.61
5. Emergency Fund, China	36,042.00
6. Memorials for Dr. Adrian Stokes	20,197.07
	$781,888.55

IV. ADMINISTRATION

1. Maintenance of New York, European, and Peking offices	$600,357.60
	$21,690,738.52

Funds and Property

As of December 31, 1928

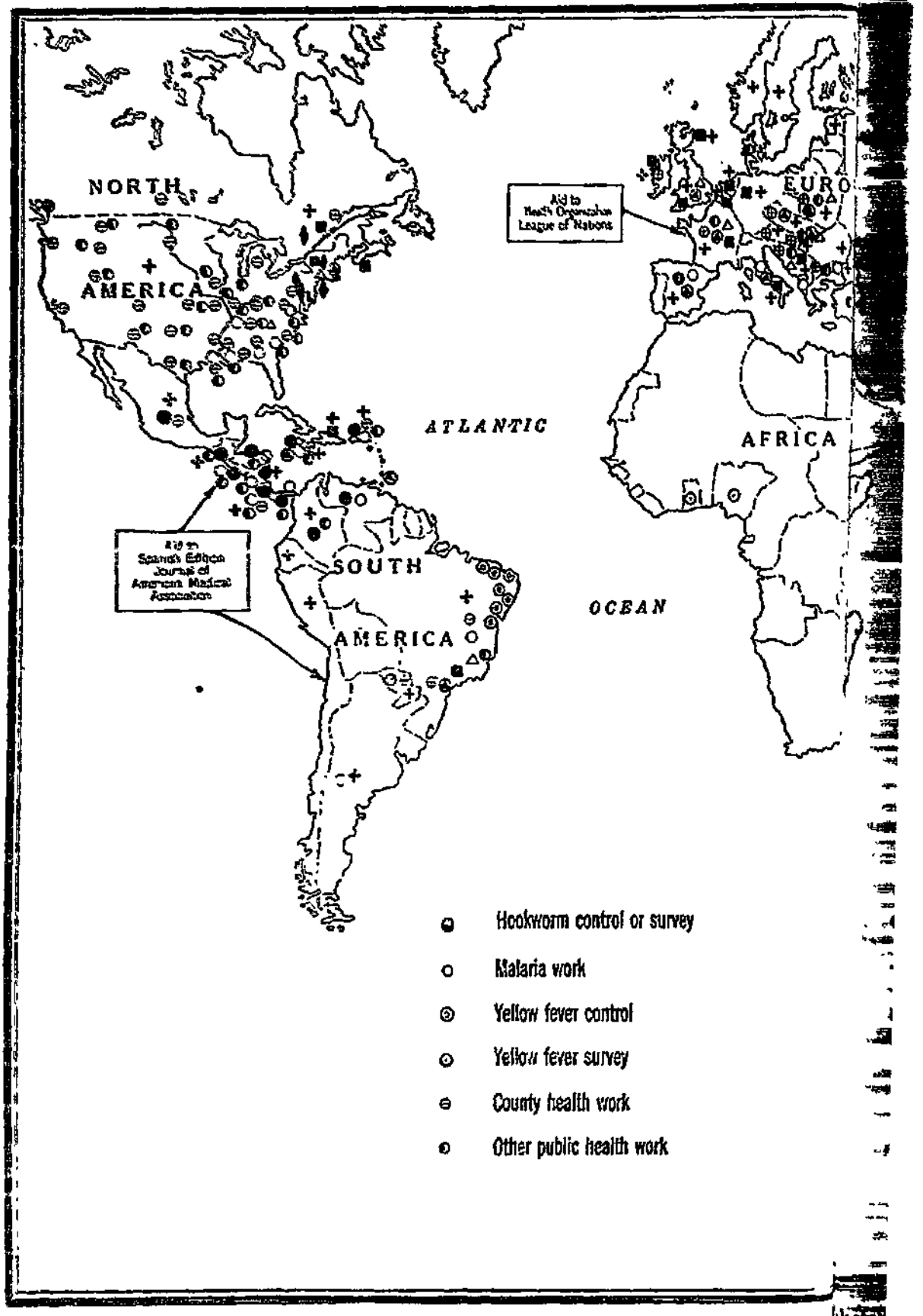
PRINCIPAL FUND

Book value as of December 31, 1927	$162,291,624	
Deduct:		
Amount withdrawn from principal in accordance with resolution of the Members, November 9, 1928.	12,000,000	
Principal Fund as of December 31, 1928		$150,291,624

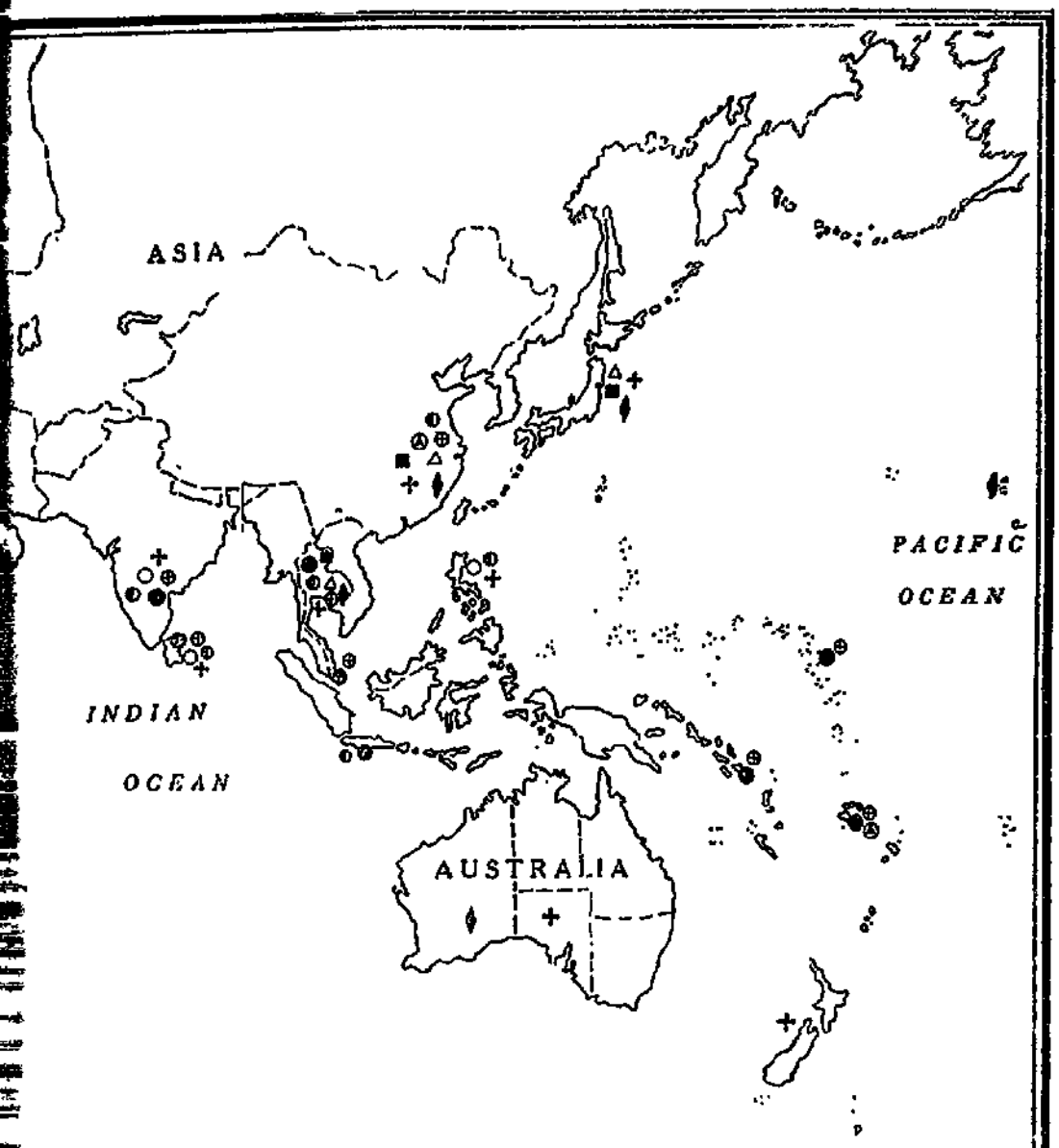
LANDS, BUILDINGS, EQUIPMENT[1]		
In China:		
Shanghai Medical School: land.....	$298,332	
Peking office: land and building.....	10,809	
In New York:		
Furniture and equipment of offices...	45,832	
In Paris:		
Part interest in building occupied by Paris office.....	68,000	422,973
UNDISBURSED INCOME		
General income (For offsetting liabilities, see below).....		$6,745,054
UNPAID APPROPRIATIONS, PLEDGES, AND AUTHORIZATIONS		
Unpaid appropriations for 1928 and prior years		$5,057,633
Appropriations, pledges, and authorizations which become effective in 1929 and subsequent years:		
1929.....	$10,796,933	
1930.....	3,559,296	
1931.....	1,237,213	
1932.....	622,525	
1933.....	375,550	
1934.....	106,960	16,698,477
		$21,756,110

A full statement of the finances of the Foundation will be found in the report of the Treasurer, pages 357 to 419.

[1] By action of the Members, November 9, 1928, the property of the Peking Union Medical College costing $9,258,515, formerly carried in this account, was transferred to the China Medical Board, Inc.



Map of world-wide activities



Public health education

Countries in which fellowships were granted

Countries in which aid was given to medical schools

Countries in which aid was given to premedical and biological sciences

Countries in which aid was given to nursing education

Foundation in 1928.

INTERNATIONAL HEALTH DIVISION

Report of the Director

To the President of the Rockefeller Foundation:
Sir:

I have the honor to submit herewith my report as Director of the International Health Division of the Rockefeller Foundation for the period January 1, 1928, to December 31, 1928.

Respectfully yours,

FREDERICK F. RUSSELL

Director

TABLE OF CONTENTS

INTERNATIONAL HEALTH DIVISION

I

In presenting a report of the work of the International Health Division for 1928 it is natural to review the principles which guide the efforts of the division, the methods by which its aims are effected, and the trends of its activities. The division represents an unofficial organization in the field of public health and serves both administrative and investigative functions. Its work is accomplished by the contribution of funds and by providing the services of staff members. On the request of, and in cooperation with, governmental authorities its representatives make surveys, investigate special field problems in the prevention of disease, and advise and participate in the administration of public health programs.

The regular staff of the division consists of a director, four associate directors, two assistant directors, and a group of medical field directors who numbered fifty during 1928. Of the field directors, fourteen were stationed in the United States and Mexico, six in the West Indies and Central America, eleven in South America, and

three in West Africa; five were on assignment in European countries, while eleven served in the East. There were twenty-eight special staff members on temporary assignments; this number included sixteen members in yellow fever service, five engineers, and seven medical men and technical specialists.

Since the organization of the Foundation in 1913 the public health activities in which it has taken an active interest have become generally recognized. Scientific studies of hookworm disease, incidence surveys, and campaigns against the disease played a major rôle in the beginning. Studies and demonstrations in malaria control were next undertaken. To consolidate the gains made against these diseases it was soon apparent that efficiently administered central and local health departments with full-time personnel were necessary. As an outgrowth of many hookworm and malaria projects official health departments have been established or reorganized. These departments have gradually enlarged their programs to meet the general health problems which are of importance in their particular countries or areas. In the hope of eliminating yellow fever from the list of preventable diseases a large share of the Foundation's efforts and expenditures have been directed against that disease.

In addition to its financial resources the

strength of the Foundation's public health operations seems to have been in certain cardinal principles to which it has adhered. Cooperative relations have been limited to official government agencies, a principle which has proved sound and fruitful of lasting gains. Acting on the premise that public health is a function of government the Foundation has undertaken programs only upon the request of the responsible government authority which will be charged with their permanent execution. Preliminary surveys and studies have been considered a prerequisite. Another policy which has been advantageous to the Foundation has been the restriction of its activities to certain definite fields. Many meritorious invitations for assistance have been necessarily declined. In spite of these limitations, the developments in public health organization and practise have been so rapid in recent years that a point is reached in every country when a quantitative limit must be placed on the number of opportunities for aid which the Foundation can accept. It has been the aim of the organization to demonstrate and not to offer permanent subsidy.

Financial aid is further conditioned in most cases on the ability of the central and local authorities to participate in the expenditures. Since the Foundation's share is usually a small

part of the whole budget, the withdrawal of its support does not burden the government or endanger the continuance of the project. Temporary assistance enables a demonstration to develop into a permanent feature of the official health machinery.

Of the total disbursements of $2,750,443.57 made by the International Health Division during 1928, the sum of $685,015.45 was paid on account of pledges for the building, equipment, and endowment of public health schools and institutes. The balance of $2,065,428.12 was appropriated for hookworm, malaria, and yellow fever work, county or rural health work, aid to state health services, public health education, and miscellaneous items.

In the early years of the Foundation's history the largest percentage of expenditures was for campaigns against hookworm disease. This percentage has decreased from year to year but still amounted to $209,099.74 in 1928. The expenditures for antimalaria activities have been slowly increasing since the beginning of cooperative efforts in this field, totaling $268,956.42 during the past year. The allotments for malaria work in the United States have decreased, while grants for the work in foreign fields have increased.

Appropriations for yellow fever work have

been decreasing. In former years the Foundation was called upon to spend large sums to aid governments in the fight against that disease in several centers. Since the foci of yellow fever have become more restricted the cost of cooperative control efforts has decreased. On the other hand, the relative amount devoted to research on yellow fever has increased in recent years; in 1928 the expenditures for all yellow fever work aggregated $416,118.02.

The decreases in appropriations which have been mentioned have been balanced by corresponding increases in the grants for rural health work and central health services, which were $467,004.19 and $181,896.38 respectively in 1928. Likewise, there has been a gradually increasing amount spent for public health education, since it is recognized that progress depends primarily on trained men who are native to the countries in which the public health measures are to be effected. Expenditures for fellowships and other contributions to education were $352,896.32 during 1928.

In the various fields of public health which the Foundation has entered there have been a broadening interest in and an increasing financial support of fundamental research. Field studies for the purpose of enlarging and improving knowledge regarding certain preventable dis-

eases are each year playing a more important part in the division's activities.

II

Yellow Fever

Fighting the Disease in Brazil

Yellow fever was recognized in the city of Rio de Janeiro, Brazil, in May 1928, and before the end of the year 144 cases were reported, most of which occurred in June and July. This was the first time since the work of Oswaldo Cruz, from 1902 to 1908, that the disease had been epidemic in the city. How or when it gained access is a matter of conjecture, but the probability is that it entered from some focus in the north, the old yellow fever area in Brazil. Realizing that the introduction of yellow fever into Rio de Janeiro might have serious consequences because of the large number of non-immunes residing there and in the surrounding country, the Department of Public Health of Brazil organized a strenuous campaign as soon as the presence of the disease was confirmed. Oswaldo Cruz's original program, which included an antilarval service, the liberal use of insecticides, isolation of cases, and fumigation, was revived, and these activities were continued throughout the remainder of the year.

In Northern Brazil where the Foundation's Yellow Fever Commission has been working

since 1923, yellow fever was first confirmed during 1928 in the state of Sergipe near the town of Estancia. This case occurred in March, but

Cases of yellow fever were reported in Brazil during 1928 in the city of Rio de Janeiro and in the states of Sergipe, Pernambuco, and Bahia, in the northern part of the country.

investigation showed that there had been suspicious cases in this area since the latter part of 1927. The last reported case in this state occurred in June. In April a case of yellow fever was reported from a small town in the state of Pernambuco, and in June a case from another small town was confirmed. In September one was reported in Recife, the capital. In the state of Bahia, which has always been considered an endemic center of yellow fever in Brazil, seven

cases were confirmed in the city of São Salvador, one of these in June, two in August, one in September, one in October, and two in December. Two suspicious cases were also reported in June; while two others were brought in from neighboring towns. The total number of cases in Northern Brazil during 1928 was twenty-one, of which nine occurred in São Salvador.

Antilarval Measures in the North.—Antilarval work against *Aedes aegypti* was carried on throughout the year in the cities of São Salvador, Recife, Parahyba, and Natal. Work in this area was directed by a representative of the Foundation in cooperation with the Brazilian Rural Health Service. Following the occurrence of cases in Sergipe and the outbreak in Rio de Janeiro, antilarval work was undertaken in Aracajú (Sergipe), Fortaleza (Ceará), and Maranhão (Maranhão). Antimosquito measures were pursued in some of the interior towns by the Brazilian Health Service.

The changes in policy effected in 1927 in the antilarval services of the Foundation's Yellow Fever Commission were maintained during 1928. The responsibility for preventing the breeding of the yellow fever mosquito, *Aedes aegypti*, was placed more and more upon the householder, and every effort was made to enlist his cooperation in keeping his premises free from aedes breeding-

places. Mosquito-proof water-jars provided with covers and faucets have been used more extensively, and the number of containers per household is being reduced to a minimum in order to limit the possible danger of aedes breeding.

The breeding index now used in Northern Brazil, which measures the efficiency of the antilarval service, is more exacting, since it depends on the number of buildings in or around which breeding is found. The former standard was based on the total number of habitations or living quarters. The activities of the commission have been directed primarily against aedes breeding, while the control of other mosquitoes has been left to the local health services. By a system of inspections and reinspections, the accuracy of the reporting of aedes breeding has been increased. The reduction in the number of water-containers may have forced the female aedes to seek other places for depositing her eggs, and it has therefore been necessary to extend the scope of routine inspections to roof gutters, drains, stems of plants, and other unusual places. Only slight progress has been made in providing an increased piped water service for the houses. An adequate piped water-supply, which eliminates the necessity of storing water in open containers, has long been recognized as an effective preventive of yellow fever.

The need for extending the yellow fever control activities in Brazil has been realized. From the experience gained in Ecuador, Mexico, and Central America, it was thought that the control of the large coast cities in the endemic area of Brazil would eliminate the disease in the less densely populated areas of the interior. This procedure proved successful in other countries because the population outside the cities was small and means of intercommunication were limited. When the disease was once controlled in the larger centers it did not persist indefinitely in the country. Although the interior towns in Brazil are small, a movement of population from one community to another occurs constantly, owing to the rapid development of transportation in recent years, and experience seems to show that yellow fever may be kept alive in these areas through a continual supply of non-immune persons. For this reason there has been a change in the cooperative program of the Brazilian Government and the Foundation, which has culminated in a new three-year agreement whereby the Foundation, with the support of the national Department of Public Health of Brazil, through its state officials, is to extend antilarval work to the larger interior towns in Northern Brazil.

Yellow Fever Laboratory Established.—With the

enlarged program of yellow fever control, it seemed advisable to have a laboratory in the state of Bahia, similar to the one in operation in Lagos, Nigeria, in order to study the Brazilian disease, facilitate the diagnosis of doubtful cases, and work on the various field problems.

A representative of the Foundation went to Brazil and, with the assistance of a member of the West African Yellow Fever Commission, established a laboratory in São Salvador in July. Indian monkeys, *Macacus rhesus*, a species which had been found susceptible to yellow fever in the Lagos laboratory,[1] were imported and used to establish the Brazilian strain of the disease. At the end of the year strains from three Brazilian cases of yellow fever—one from Rio de Janeiro and two from São Salvador—and the Asibi strain from Africa had been transmitted to monkeys.

The disease was passed from animal to animal by blood inoculation and by bites of aedes mosquitoes. At the close of 1928 experiments with monkeys that had recovered from the Brazilian disease were in progress to test their immunity to African yellow fever. The experimental data were sufficiently complete at the end of the year to show beyond reasonable doubt that an attack

[1] Adrian Stokes, J. H. Bauer, and N. P. Hudson, "Experimental Transmission of Yellow Fever to Laboratory Animals," *American Journal of Tropical Medicine*, 8: 103–164 (March) 1928.

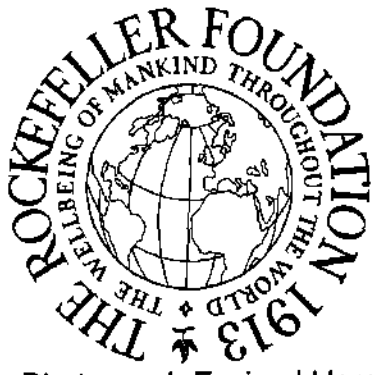
of Brazilian yellow fever is a definite protection against the African virus.[1]

Yellow Fever in West Africa

Laboratory Studies.—In West Africa, during the first five months of 1928, attention was focused mainly on the investigations of Dr. Hideyo Noguchi in Accra on the Gold Coast, and several members of the staff of the West African Yellow Fever Commission were detailed to assist him. His studies were practically completed and he was preparing to sail for America when he contracted yellow fever and died on May 21. About ten days later Dr. W. A. Young, director of the Medical Research Institute, Accra, also died, the third victim of yellow fever among research workers investigating that disease in West Africa.

In Lagos, Nigeria, where the West African commission maintains its headquarters, various laboratory studies were completed during the year. As long ago as 1898 Dr. H. R. Carter had noted that two to three weeks elapsed between the infecting case of yellow fever and the secondary cases; he called this interval the period of extrinsic incubation. Subsequent observations led to the conclusion that an interval of at least twelve days must elapse following an in-

[1] N. C. Davis, "Studies in South American Yellow Fever II: Immunity of Recovered Monkeys to African Virus," *Journal of Experimental Medicine*, 49: 975-991 (June) 1929.



Photograph Excised Here

Dr. W. A. Young, director of the British Medical Research Institute at Accra, Gold Coast, West Africa, who died of yellow fever May 30, 1929, at the age of thirty-nine. A member of the West African Medical Staff since 1913, Dr. Young served as assistant bacteriologist at the Medical Research Institute in Nigeria and as pathologist in Gold Coast prior to his appointment as director of the Medical Research Institute at Accra. He held a place of distinction in the field of research. His interest centered chiefly in yellow fever, and he made important contributions to knowledge of that disease.

Photograph Excised Here

Dr. Hideyo Noguchi in the laboratory of the British Medical Research Institute in Accra where he worked during his stay in West Africa. Dr. Young, the director, placed all the facilities of the laboratory at Dr. Noguchi's disposal and made large numbers of examinations for him.

fecting meal before the aedes mosquito can transmit the disease by its bite. At Lagos, by means of a series of laboratory experiments with monkeys, the extrinsic incubation period has been more precisely determined.[1] The virus of yellow fever was transmitted by the bite of the mosquitoes in one experiment on and after the ninth day, and in two experiments on the twelfth day after the initial infecting meal. That the virus is present in the mosquito throughout the extrinsic incubation period was proved by injecting the crushed bodies of mosquitoes into normal monkeys at daily intervals after the insects had fed on an infected animal.

Throughout the year experiments were conducted to determine whether mosquitoes other than the *Aedes aegypti* were capable of transmitting yellow fever, an important question from the point of view of control measures. The following species were also found capable of transmitting the disease under laboratory conditions: *Aedes luteocephalus*, *Aedes apicoannulatus*, and *Eretmopodites chrysogaster*.[2]

The death from yellow fever of a member of the commission, in 1927, when there had been no

[1] J. H. Bauer and N. P. Hudson, "Incubation Period of Yellow Fever in the Mosquito," *Journal of Experimental Medicine*, 48: 147–153 (July) 1928.

[2] J. H. Bauer, "Transmission of Yellow Fever by Mosquitoes Other Than *Aedes aegypti*," *American Journal of Tropical Medicine*, 8: 261–282 (July) 1928.

Photograph Excised Here

The biochemical laboratory of the Foundation's West African Yellow Fever Commission at Lagos, Nigeria.

Photograph Excised Here

Triple-doored entry to the quarters in which the West African Commission houses its experimentally infected animals.

obvious exposure to the disease, had raised the question of the risk of infection to laboratory workers. Studies at Lagos showed that blood taken from an infected monkey at the onset of fever contained sufficient virus to cause fatal yellow fever in a normal animal, if rubbed on the unbroken skin.[1]

Important studies in the gross and microscopic pathology of yellow fever were contributed during 1928 by the workers at Lagos.[2] The principal gross lesions found in monkeys are jaundice, hemorrhage, pallor of various parts, and changes in the liver, kidney, and spleen. Jaundice and hemorrhage are variable in occurrence and degree, but the pallor of the liver and its buff or yellowish "boxwood" color are constant and definite. The liver shows the most extensive and constant microscopic pathology; fatty degeneration, midzonal necrosis, and nuclear changes are prominent. In the kidneys the renal epithelium shows cloudy swelling, fatty degeneration, and less extensive necrosis; the tubules contain hyaline, granular, and, in some instances, calcareous casts. Fatty degeneration is almost always found in the muscle fibers of the heart.

[1] J. H. Bauer and N. P. Hudson, "Passage of the Virus of Yellow Fever through the Skin," *American Journal of Tropical Medicine*, 8: 371–378 (September) 1928.

[2] N. P. Hudson, "Pathology of Experimental Yellow Fever in the *Macacus rhesus*," *American Journal of Pathology*, 4: 395–429 (September) 1928.

The pathology of the spleen includes congestion, diminution of lymphocytes and lymphoblasts, necrosis of lymph nodules, and a marked endothelial response in the nodules and pulp. Fat appears in this organ in the necrotic areas and in the endothelial cells of the nodule and pulp.

A comparison of the pathological changes in the monkey with those occurring in human cases of yellow fever shows a striking parallelism as regards icteric color, recent hemorrhages, and the appearance of liver, kidney, and spleen. Microscopic changes are generally similar; fatty degeneration of the liver, kidney, heart, and spleen is usually more pronounced in the monkey, while in human cases congestion and hemorrhages in the liver, lungs, and gastric mucosa tend to be more frequent. Necrosis of the adrenal glands is only rarely seen in human cases although commonly observed in monkeys.

Immunological studies on the protective value of sera from convalescent human yellow fever patients were made at Lagos as well as at Bahia.[1,2] Sera from yellow fever cases which occurred in

---

[1] N. P. Hudson, J. H. Bauer, and C. B. Philip, "Protection Tests with Serum of Persons Recovered from Yellow Fever in the Western Hemisphere and West Africa," *American Journal of Tropical Medicine*, 9: 1-16 (January) 1929.

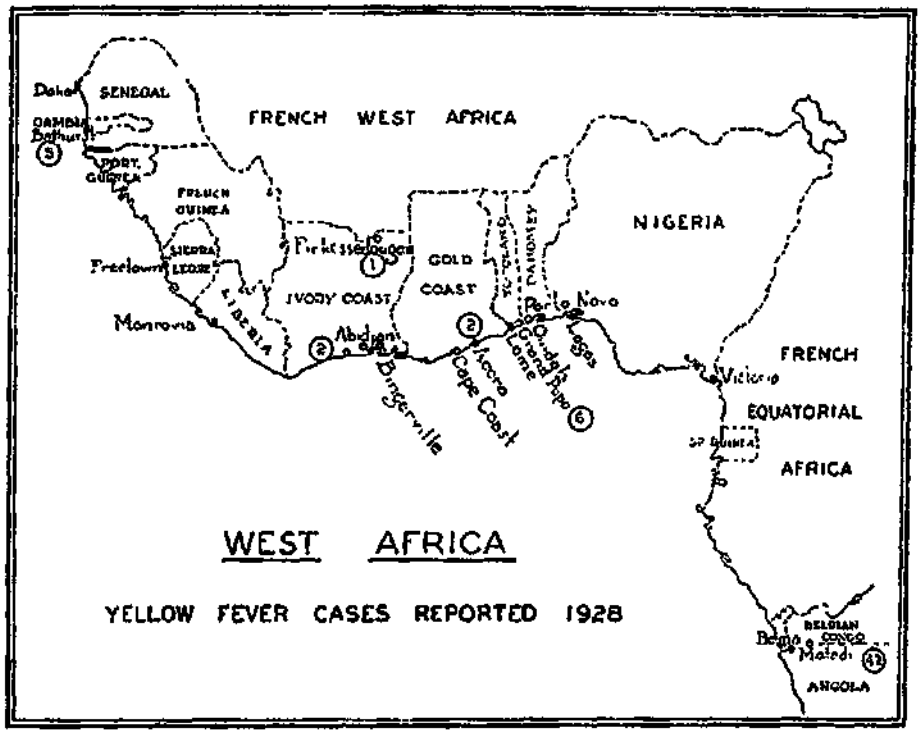
[2] N. P. Hudson, C. B. Philip, and G. E. Davis, "Protection Tests with Serum of Persons Recovered from Yellow Fever in the Western Hemisphere and West Africa: Additional Report," *American Journal of Tropical Medicine*, 9: 223-232 (July) 1929.

Mexico, Peru, and Brazil from 1919 to 1927 and sera from cases occurring in Rio de Janeiro in 1928 were used. Similar tests were made with sera from yellow fever cases which occurred in Africa from 1926 to 1928. Since both the American and African sera protected monkeys against a lethal dose of the Asibi strain of the African virus, further evidence of the identity of the disease in both regions was established.

Laboratory studies on the biochemistry of normal monkeys and of others infected with yellow fever were carried out during the year and will be reported at a later date.

Incidence of the disease in 1928.—Yellow fever was quiescent on the West Coast of Africa in 1928. No cases of the disease were reported from Senegal, where widespread epidemics had occurred in 1926 and 1927. Of the other French colonies, the Ivory Coast reported three cases and Dahomey six cases. Aside from the two laboratory infections in Accra in May, no cases were reported from either the Gold Coast or Nigeria. In December five cases were reported from Bathurst in Gambia. The only outbreak of any size was that in the Belgian Congo early in the year when some forty-two cases and twenty-five deaths were reported. These cases were all in the neighborhood of the towns of Boma and Matadi near the mouth of the Congo River.

In May the Director and the Epidemiologist of the commission attended the African Conference on Yellow Fever held in Dakar, Senegal.



Countries on the west coast of Africa where yellow fever was reported during 1928. The figures within the circles show the number of confirmed cases in the various areas.

Following this meeting, epidemiological observations on the Senegal outbreaks of previous years were made possible by the cooperation of the French authorities. Similar studies were made of the 1927 outbreaks in Larteh and Accra on the Gold Coast. A member of the commission's field staff visited the Belgian Congo to investigate the cases which occurred there during 1928. During the latter part of the year a search for suspicious outbreaks was conducted in South-

western Nigeria. Ibadan was selected as field headquarters. In June a suspicious epidemic in Ife was investigated. In July the report of a strange epidemic was received from the Kuku-ruku area in Benin Province, near the Niger River. The latter disease proved to be of special interest because the cases showed a superficial resemblance to yellow fever as seen in the African native. One or more of the commission's field staff remained continuously in that area during the rest of the year, studying the disease. It was concluded that in view of several distinguishing differences this disease was not yellow fever: a relatively mild albuminuria was found; protection tests with the blood of convalescents were uniformly negative; attempts to transmit the disease to monkeys were unsuccessful; and the pathological changes observed in three fatal cases were not similar to those found in yellow fever.

Research on Yellow Fever Virus in New York

The discovery of a laboratory animal, *Macacus rhesus*, susceptible to yellow fever opened a wide field of possible investigation which hitherto could not be approached. Some of the problems confronting the laboratory apply directly to field work and must be solved in the yellow fever area: for example, diagnostic tests of material

Photograph Excised Here

One of the West African Yellow Fever Commission's motor cars ready for a trip to a community in the interior where yellow fever has been reported.

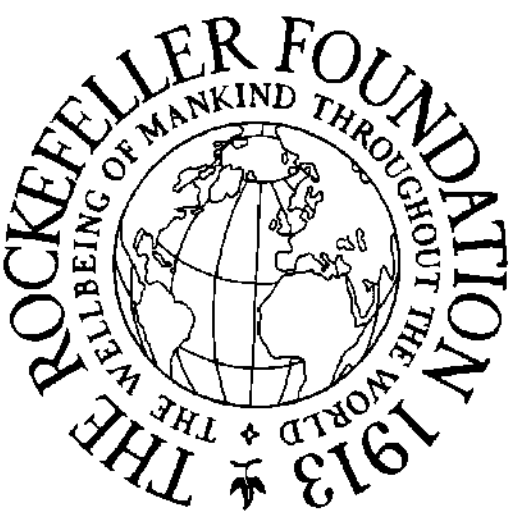
Photograph Excised Here

A typical native home in a West African village.

from human cases of yellow fever to determine its infectivity for monkeys and tests of the immunity conferred by human convalescent serum upon monkeys. The identification of mosquitoes capable of transmitting the disease and studies of their life cycles, their habits of breeding and flight, and their seasonal prevalence must also be carried on in the field.

There are other problems, however, which do not have to be solved where cases are occurring and which may be handled more advantageously where personnel and equipment are more easily available. Such studies relate to the characteristics of the yellow fever virus as determined by various laboratory procedures, including a comparison of the strains of West African and Brazilian yellow fever as they affect monkeys. To relieve the field laboratories in Lagos and Bahia of the necessity for making these studies, a yellow fever laboratory was established in June at the Rockefeller Institute in New York City, under the direction of Dr. W. A. Sawyer and through the courtesy of Dr. Simon Flexner.

The first step was to establish in monkeys strains of the disease from both continents. This proved to be a difficult matter as it required about a month for a specimen from either Lagos or Rio de Janeiro to reach New York. The preparation of the virus for shipment so that



Photograph Excised Here

Entomologist of the West African Yellow Fever Commission and an assistant pumping water from crab-holes in order to study varieties of larvae breeding in these water collections.

Photograph Excised Here

Central water-station in Parahyba, Brazil. In Brazilian communities that are not provided with a piped water-supply the residents secure water at a central supply-station and store it at their homes in receptacles of various kinds.

it would survive the trip was a problem which led to considerable study both in Lagos and in New York. By the end of the year both strains were established in the New York laboratory and various methods of preserving the virus had been tested. These results may be summarized as follows:[1]

1. Yellow fever virus in citrated or clotted blood, when kept in the refrigerator, dies out rapidly.

2. Storage of blood or liver tissue in 50 per cent glycerin in the refrigerator will usually keep the virus alive for sixty days, and may do so for a hundred days, but with the injection of the older material there is a marked tendency towards a lengthening of the incubation period and an increase in the number of recoveries.

3. The virus may be preserved for at least thirty days in liver which is kept continuously frozen.

4. The most satisfactory method found for preserving the virus consists of drying the material in a vacuum while it is in the frozen state, and keeping it continuously in the refrigerator in sealed glass containers. Blood or liver tissue preserved in this way has maintained its virulence for at least 154 days.

[1] W. A. Sawyer, W. D. M. Lloyd, and S. F. Kitchen, "The Preservation of Yellow Fever Virus," *Journal of Experimental Medicine*, **50**: 1–13 (July) 1929

III

Public Health Education

If the great masses of the population are to enjoy the benefits of hygiene and preventive medicine, leaders with a theoretical and practical knowledge of their subjects are a prerequisite. The preparation of administrators, investigators, and other public health workers for their special tasks has been considered by the Foundation as the first step in the public health program of any country. During 1928 assistance was given in the field of public health education by (1) aid to schools and institutes of hygiene; (2) contributions towards teaching public health in medical and other schools; (3) travel grants to government health officials; (4) fellowships; (5) practical field training for rural health workers and students of malaria; (6) provision of funds for the teaching of native medical assistants in the South Pacific, and (7) aid to nursing services.

Schools and Institutes of Hygiene

During 1928 the Foundation fulfilled its pledges of financial aid towards the building programs of the Institute of Hygiene at São Paulo, Brazil, and the State Hygienic Institute at Budapest, Hungary. Payments were continued, according

to agreement, towards the capital expenditures of the State Institute of Public Health at Prague, Czechoslovakia, and towards operating costs of the London School of Hygiene and Tropical Medicine.

Brazil

Institute of Hygiene, São Paulo.—Final payments were made upon a total contribution of approximately $188,000 towards the cost of building and equipping the new Institute of Hygiene at São Paulo. Progress was made in the construction of the building which was begun during the year.

Czechoslovakia

State Institute of Public Health, Prague.—Creditable results were achieved during 1928 by the various divisions of the State Institute of Public Health at Prague, in the building program of which the Foundation is assisting. An increasing amount of sera and vaccines was distributed; epidemiological studies relating to diphtheria, scarlet fever, malaria, and typhus fever were conducted. In cooperation with the health officer for the city of Prague, 12,000 children were immunized against scarlet fever and a film on the prevention of smallpox through vaccination was prepared. The main building of the

institute, which will house several divisions, was started early in 1928.

England

London School of Hygiene and Tropical Medicine.—The Foundation continued to provide funds for the salary of the director of the London School of Hygiene and Tropical Medicine and other expenses connected with the maintenance of the institution. The program of the school was broadened by the creation of several new divisions. The student enrolment for the academic year 1927–28 was 166; the majority of the students matriculated in the courses of tropical medicine and hygiene. Special classes included 106 additional students. For the first time a course of lectures in tropical hygiene was prepared for laymen; this proved an interesting and valuable departure. It is expected that the school will occupy its new building about August 1, 1929.

Hungary

School for Public Health Officers, State Hygienic Institute, Budapest.—A total sum of approximately $290,000 has been paid by the Foundation towards the construction and equipment of the State Hygienic Institute at Budapest, which was opened in the fall of 1927. Since all public health officers in Hungary are required to com-

plete a course in public health before entering the state health service, more adequate training was provided by the creation of a school for public health officers in the State Hygienic Institute. Towards the maintenance of this school the Foundation agreed to contribute funds on a declining scale over a five-year period beginning in 1928. The first course was begun in February 1928 with an enrolment of twenty-five students, all of whom successfully completed the training, which covered a period of nine months. A post-graduate or "refresher" course was given for two weeks in November 1928 and was attended for the most part by health officers already engaged in public health work. It is planned to give at least one short course of this type in 1929.

Teaching Hygiene in Medical and Other Schools

United States

Harvard Medical School.—Aid was continued in developing a program to emphasize the teaching of preventive medicine at the Harvard Medical School. A syllabus of preventive medicine has been compiled and will be issued by the school within a short time.

Trinidad

Imperial College of Tropical Agriculture.—In Trinidad the Foundation maintained its subsidy

to the chair of sanitation and tropical hygiene which was established in the Imperial College of Tropical Agriculture in 1925.

China

Peking Union Medical College.—The services of the representative of the International Health Division in China were continued as professor and head of the department of hygiene and public health of the Peking Union Medical College.

Travel Grants to Public Health Officials

Visual experience is more impressive than information gained through the intermediary channel of narration. The Foundation has, therefore, considered travel or observational tours by public health officials to be an important medium of health education and a fruitful means of broadening their public health views and knowledge. For a number of years the practise of making travel grants to selected health workers, thereby enabling them to spend periods varying from a few weeks to several months in visiting other countries or states, has been followed.

During 1928 public health officials representing Hungary, India, Porto Rico, Siam, and West Africa visited the United States and certain countries in Europe and the East as guests of the Foundation. A commission of four members

selected by the Italian government made a tour under Foundation auspices to inspect outstanding health activities in the United States and Europe. Similar opportunities were arranged for fifteen representatives of central and local health services of eight countries of Europe, comprising Austria, Czechoslovakia, France, Hungary, Norway, Poland, Rumania, and Spain; these persons visited European countries other than their own.

Travel grants were also made by the Foundation to forty-seven persons who were associated with the public health work of state or provincial governments or educational institutions in thirteen states of the United States, in six provinces of Canada, and in Mexico, to permit them to observe various aspects of public health work in the United States and Canada. For the first time funds were provided to enable European health workers to secure special field training in Europe; a total of nine persons from France, Norway, and Poland received grants for this purpose. In addition to benefiting the visitors, these travel grants have in many instances been advantageous to the health officials who act as hosts, since opportunity is afforded for exchange of ideas and appraisal of different institutions and methods.

Fellowships in Public Health

The eleventh year of the International Health Division's fellowship program was completed in 1928. Fellowships are sponsored by the division because of the need of trained personnel in the official health agencies, a need which is not peculiar to any country or continent. The fellowships are granted to governmental agencies on behalf of qualified men and women of their selection, with the understanding that these persons are to be trained for definite posts in the health services of the governments requesting their appointment. While the grants have been provided mainly for medical graduates, public health nurses, and sanitary engineers, awards have also been made to statisticians, bacteriologists, and laboratory aides.

During the past year, 201 fellowships were effective. Of this number, 113 were granted for study in the United States. Seventy-nine were resident fellowships awarded to men and women for study in their own countries; 122 fellows crossed national borders. The fellowship grants for the year included twenty-eight nationalities, as follows: Austria 1, Brazil 14, Bulgaria 10, Canada 7, Ceylon 1, China 4, Colombia 3, Costa Rica 1, Czechoslovakia 4, Ecuador 1, France 2, Guatemala 3, Honduras 1, Hungary 15,

India 6, Ireland 2, Japan 2, Mexico 3, Palestine 1, Paraguay 1, Porto Rico 4, Poland 29, Rumania 7, Spain 6, Turkey 8, United States 18, West Indies 2, Yugoslavia 45.

The fellowships were granted to train individuals in the following subjects: public health administration, public health laboratory service, public health nursing, sanitary engineering, epidemiology, malaria, vital statistics, tuberculosis work, maternity welfare, and child, school, and industrial hygiene.

Field Training Stations in the United States

Recognizing the need of practical training for public health workers the Foundation has for a number of years supported or aided in the support of several field training stations in the United States. The rapid growth of county health work in recent years has created a greater demand for health officers and public health nurses than could be met by the numbers completing courses in the schools of public health and public health nursing. In this emergency the training stations have temporarily filled the gap. While not pretending to give a comprehensive training in public health or preventive medicine in one or two months, they have avoided the alternative of allowing workers to be placed in positions for which they have had little preparation. The

field stations have also been utilized for workers who wished to complete their academic preparation in public health by practical field experience under rural conditions.

Cooperative Stations in Mississippi and Ohio

During 1928 the Foundation maintained field stations at Indianola, Sunflower County, Mississippi, and at Greenville, Darke County, Ohio, in conjunction with the respective state departments of health. The Indianola station was established primarily for personnel who were to engage in rural health work in the area flooded by the Mississippi River in 1927. During the past year, however, prospective county health workers from other sections, particularly of the Southern States, were also accepted there. The Greenville station has served for the most part the central and northern states and the Canadian provinces.

At Indianola forty physicians, fifty-five public health nurses, and forty sanitary inspectors spent about six weeks each actively participating in the work of a typical county health organization. They observed and assisted in communicable disease control, prenatal and preschool child clinics, the medical inspection of school children, home nursing visits, immunization activities, and

rural sanitation. At the Greenville station twenty-six physicians, seventeen nurses, and eleven sanitary inspectors were given training grants and benefited by the personal supervision of an experienced county health department staff in their routine activities. These two stations prepared health officers, public health nurses, and sanitary inspectors for service in the county health departments of thirteen states of the United States: (Arkansas, Georgia, Kansas, Kentucky, Michigan, Mississippi, Missouri, New Mexico, Ohio, South Carolina, Tennessee, Virginia, and West Virginia), and two provinces of Canada (Quebec, and Saskatchewan).

Besides providing an introduction to county health work by actual contact, the training stations have served an important purpose in affording opportunity for the appraisal of personnel before they are given responsibilities of their own. In each case the director of the station has made a report on the qualifications and aptitudes of the individual workers to the state health officials concerned, to guide them in their selection and placement of personnel. By this procedure 10 to 15 per cent of the prospective workers have been eliminated as unsuited for that service. Among the eighty-five health departments established in flood area counties since

July 1927 there have been no failures or discontinuance of services due to incompetent or misplaced personnel. This fact attests to one valuable function of the training stations, where the majority of the county workers for the flood area were trained and appraised.

Alabama Training Station

During the past year the Department of Health of Alabama continued the Wetumpka, Elmore County, training station, which was established on a similar plan for the training of personnel to be employed in the expanding county health service of that state. This station was organized and has been administrated by the state Health Department; the Foundation has cooperated by meeting one-half the expenses of the persons in training. In 1928 twenty-six physicians, thirty-eight public health nurses, and ten sanitary inspectors spent an average of six weeks at the station in preparation for rural health service in Alabama.

Training Health Officers in Tennessee

In Tennessee the state Health Department and the Medical School of Vanderbilt University have collaborated in training health officers for that state. A three months' course is divided between didactic instruction and practical ex-

perience. For six weeks the student health officers attend lectures and laboratory exercises in the various branches of public health. In the following six weeks they observe at first hand the organization and administration of public health procedures in a well-conducted state health department, a city health department, and a county organization. By this cooperative arrangement on the part of the teachers of preventive medicine in the medical school and the official health workers a group is trained each year. In 1928 the Foundation aided by contributing one-half the living and traveling expenses of a class of thirteen prospective health officers.

The Tennessee plan seems to be a compromise between the aims and achievements of the courses provided by the schools of public health and the training offered at other field stations. It is an interesting example of the present efforts in the United States to meet a situation in which the supply of health workers, limited by economic factors, does not meet the demands for qualified personnel.

Malaria Field Training in Europe

Corsica

Field Station Continued.—On July 1, 1928, the three-year agreement in accordance with which

the Foundation has supported a malaria field station in Corsica for the study of malaria and the training of French-speaking malariologists, was renewed for a similar period. Under the direction of a full-time malariologist, the antilarval measures at Porto Vecchio on the eastern coast have produced successful results as reflected in the reduced malaria case rate and the parasite and splenic indices within the protected area. The studies on anophelines in Corsica point to *A. maculipennis* as the most important if not the sole vector of malaria on the island.

The demonstration at Porto Vecchio and the surveys conducted by the malaria station on both the east and west coasts have secured local and national support for an extensive island-wide antimalaria program. The island government, which will receive aid from the Ministry of Labor and Hygiene of France, recently approved a project for installing four field posts similar to that at Porto Vecchio; the director of the latter post will assume general supervision of all antimalaria work on the island.

Italy

Malaria Field Training Expands.—In Italy the Malaria Experiment Station with its field study areas has provided training in antimalaria work

for several years. In 1928 the Foundation contributed special funds to extend the scope of training facilities and thereby enable the station to offer students of malaria in Italy and other countries wider opportunities for observing laboratory and practical field methods in the organization and technic of antimosquito measures.

One hundred six persons from thirty-one foreign countries received training at the central office in Rome and in districts throughout Italy where antimalaria operations were carried on under the direction of the station. These included fellows of the Foundation and of the League of Nations, students of the Superior School of Malariology in Rome, health officers and other medical personnel employed in Italy, and physicians from Albania and Egypt. More than two hundred local malaria personnel also benefited by brief periods of field experience. The method of practical malaria training developed by the station in Italy has also been adopted in Spain and Yugoslavia.

Spain

The School of Malariology.—Three separate courses, including both theoretical and practical work in malaria, were held during 1928 at the School of Malariology which is directed by a former Foundation fellow at Navalmoral de la

Mata in connection with the antimalaria demonstration in the province of Cáceres, Spain. Thirty-nine physicians participated in these courses, about twice as many as in 1927; of these students twenty-five were residents of Spain and the remainder were from foreign countries. Included in the groups were fellows of the Foundation, the League of Nations, and the Malaria Commission of the national Department of Health, and also student health officers of the school of public health at Madrid and malaria officials of various municipalities and provincial organizations in Spain.

In addition to the instruction in malaria provided at the School of Malariology, a short course in antimalaria work was organized in the city of Cáceres and a series of exercises in malaria statistics was given for the central medical malaria staff in the city of Madrid. Both courses were conducted by former Foundation fellows who are now associated with the national Department of Health.

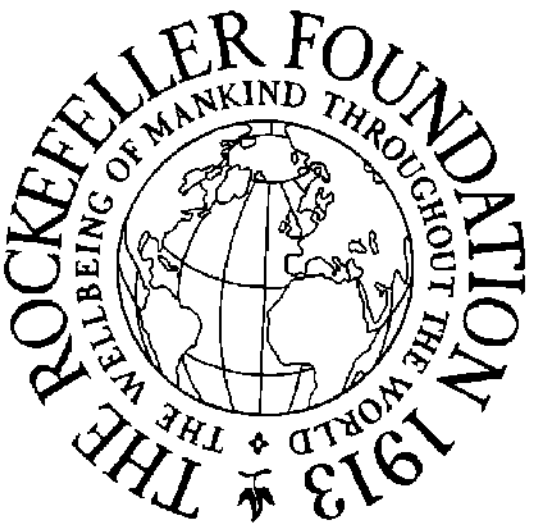
Training in the South Pacific

Fiji

School for Native Medical Students.—According to a four-year agreement with the Western Pacific High Commission of the British Government, which became effective in 1928, the

Foundation contributed funds towards the increased maintenance costs of the enlarged medical school project at Suva, Fiji, which has been designated the Central Medical School for Native Medical Students. The school derives its support from the governments of Fiji, Tonga, British Solomon Islands, Western Samoa, Gilbert and Ellice Islands, and the Cook Islands, and each group may enroll a proportionate number of students. The New Hebrides Condominium recently agreed to support the school and will enter students in 1929.

The school was officially opened on December 29, 1928, although the new buildings had been occupied for some time. Enlarged facilities permitted an increase in enrolment from twelve to forty students; the faculty consists of seven qualified physicians, one of whom is the Foundation's representative in the South Pacific, two registered nurses, and one native medical practitioner, which is the rank awarded those who complete the three-year course of instruction. The hospital facilities of Suva are adequate for clinical experience. At the close of 1928 the enrolment included seventeen students from Fiji, five from Western Samoa, four each from Tonga and the Gilbert and Ellice Islands, two from the Cook Islands, and one from the British Solomon Islands. This provision for the improved training



Photograph Excised Here

A building of the Central Medical School for Native Medical Students, Suva, Fiji, in which are located classrooms, library, and museum. The Foundation is contributing towards the maintenance of this institution over a five-year period.

Photograph Excised Here

A class of the Central Medical School for Native Medical Students at work in the physiology laboratory.

of natives as assistants to government health officials may be expected to play an important part in ameliorating health conditions among native populations in the South Pacific.

Nursing Education and Public Health Nursing

Brazil

D. Anna Nery School.—Since 1921 the Foundation has assisted the national Department of Health of Brazil in developing a nursing service, which functions through a division of nursing education and a division of public health nursing. The funds granted by the Foundation to this service in 1928 were used to supplement salaries and travel expenses of personnel and to provide additional equipment, particularly for the new teaching pavilion of the D. Anna Nery School of Nursing in Rio de Janeiro.

Students of the school now secure a well-rounded training in all the important branches of nursing through facilities for instruction and practical experience which are made available at three hospitals in Rio de Janeiro and in the practise district of the division of public health nursing. In 1928 training in the nursing care of infants under one year of age was secured for the first time at the Arthur Bernardes Hospital for Infants which is operated by the bureau of child hygiene of the national Department of Health.

Photograph Excised Here

Class of 1928, D. Anna Nery School of Nursing, Rio de Janeiro, Brazil, the fourth class to be graduated from this school, which was established by the national Department of Health of Brazil in 1923, with the aid of the Foundation.

THE ROCKEFELLER FOUNDATION 1913
THE WELLBEING OF MANKIND THROUGHOUT THE WORLD

Photograph Excised Here

A public health nurse on rounds in an outlying section of Rio de Janeiro. All the public health nurses on the staff of the national Department of Health of Brazil are graduates of the D. Anna Nery School of Nursing.

Thirty-four new students entered the school during the past year; the group which matriculated in September was the first to be enrolled in the full three years' course which is now required. At the end of the year there were in attendance sixty-five students from thirteen Brazilian states and the Federal District, representing the most widely distributed registration thus far recorded. On September 7 the fourth class of nurses, which numbered sixteen students, was graduated from the school; of these, seven received appointments to the staff of the school and seven have undertaken district work in the division of public health nursing. Since 1925 a total of seventy-one nurses has been graduated and, according to records, all but eight of these were engaged in some form of nursing activity at the end of 1928. Five recent graduates participated in post-graduate nursing study in the United States during the past year as Foundation fellows. As rapidly as possible the Brazilian trained nurses are given the local responsibilities; by the end of 1928 fifty-five of the staff of sixty nurses in the divisions of nursing education and public health nursing were Brazilians.

Public Health Nursing.—During the first five months of the year, public health nursing activities were continued in the Federal District by the division of public health nursing, with the

cooperation of the bureaus of child hygiene, epidemiology, tuberculosis, and venereal diseases. Early in June almost all routine district nursing work was suspended by the director of the national Department of Health because of the yellow fever situation, and the public health nurses were assigned to special service. During the period from June to September the nurses visited a daily average of 2,100 houses for the purpose of discovering early cases of yellow fever. In September they resumed their duties with the various bureaus.

In 1928 the division of public health nursing rendered service to 15,100 persons and the staff made a total of 48,300 home visits, of which 72 per cent were in connection with child hygiene and tuberculosis. The system of school medical inspection in Rio de Janeiro was reorganized in 1928, and a staff of school nurses was created in the Department of School Medical Inspection, where appointment is limited at present to graduates of the D. Anna Nery School of Nursing.

France

Central Bureau of Nurses.—The Central Bureau of Nurses, a division of the National Office of Social Hygiene in France, completed the third year of its cooperative program in 1928. This

bureau continued its efforts to develop higher standards of nursing service in France and to stimulate interest in that profession in order to increase the number of qualified candidates for the various training schools for nurses. The director of the bureau was able to observe public health nursing in Warsaw, Poland, under a travel grant from the Foundation.

IV

Malaria

With a view to furthering the development of effective malaria programs supported by government, the Foundation during the past year participated in activities directed towards this end in twenty foreign countries and in the United States. Funds were contributed and the services of field representatives were made available to promote antimalaria demonstrations, to undertake incidence surveys, to develop field studies and research, and to provide training for personnel.

Field Studies and Research

Serology and Immunology of Human and Avian Malaria.—Professor and Mrs. W. H. Taliaferro continued, during 1928, their laboratory and field investigations in malaria. They visited Porto Rico early in the year to test further,

under field conditions, the precipitin reaction as a diagnostic aid in human malaria. While the results were not promising with regard to their practical application in the near future, some advance has been made in the knowledge of the serology of human malaria. A satisfactory type of antigen has been prepared from infected placentas, and a serological test may yet be forthcoming after certain experimental difficulties are overcome.

Work on bird malaria carried on by these workers in their laboratory at the University of Chicago has aimed at the elucidation of certain questions regarding the nature of infection, the nature of immunity, and the mechanism of relapses. Results of the investigations indicate that if the time of sporulation is experimentally changed by refrigeration the asexual cycle will return to normal within a few days, suggesting that some factor within the host determines the nature of the vegetative cycle. A high degree of parasiticidal immunity in birds, which is probably cellular rather than humoral, has also been demonstrated. Further studies, which may have a bearing on the mechanism of relapses, are in progress.

Laboratory Observations on the Therapeutics of Malaria.—In the hope of improving the specific aids in the treatment of malaria, seventeen drugs

were tested on bird malaria during 1928 at the Johns Hopkins School of Hygiene and Public Health under the direction of Professor R. W. Hegner. The results, which have been facilitated by the development of a method of testing the drugs against the parasites in vitro, have been promising in some cases, and will be studied further. A new line of investigation by Professor Hegner and his associates has been the study of the effects of gases, such as carbon monoxide, on the malaria parasites. An incidental study suggests that sporozoites in the salivary glands may pass through an immature stage before becoming infective.

Field Studies at Edenton.—In the observation areas of the Station for Field Studies in Malaria at Edenton, North Carolina, the blood and spleen examinations made during the 1928 season showed a low incidence of malaria except in restricted sections, despite an increased amount of *Anopheles quadrimaculatus* breeding. Studies on the winter activities of the local anopheline imagines were continued. The relative number of gravid females was high in early winter; a diminution in their number occurring in January and February was ascribed to oviposition. In that latitude digestion of blood and ovarian development were observed to proceed slowly during the winter.

Routine dissections of anophelines were continued during the 1928 season. In the 2,052 dissections made in the past three years the ten positive stomach and five positive gland infections observed were in *A. quadrimaculatus* specimens. No naturally infected specimens of *A. punctipennis* or *A. crucians* have been found. In view of the alleged domesticity of infected anophelines it is interesting to note that of the fifteen infected specimens five were caught in houses, while the remaining ten were captured in stables and privies. After overcoming certain difficulties the cage-rearing of *A. quadrimaculatus* was attempted, and three generations, including the first wild-caught generation, were successfully raised between July and October. Further data were collected concerning the relation of livestock to malaria incidence. Anopheline control by the use of larvicides was successfully continued in a small urban area.

Cooperative Antimalaria Work in the United States

The number of states and counties of the Southern United States directly aided by the Foundation in combating malaria has been decreasing in recent years. This has been due in part to the gradual reduction or disappearance of the disease and also to the assumption of antimalaria activities by the staffs of the official local

health organizations. Through its support of general county health work the Foundation has aided antimalaria work as a part of the whole public health program and less by specific projects.

Despite a definite downward trend in malaria incidence in the Southern States during the past ten years, there was in 1928 a marked increase in the disease, notably in South Carolina, Georgia and Alabama. This recrudescence or epidemic wave was attributed to an abnormally high rainfall in those areas, with consequent increased anopheles production.

Special divisions of malaria control in the state health departments of Georgia, Louisiana, Mississippi, South Carolina, and Virginia were aided by the Foundation in 1928. A total of fifteen county health departments in those states and in Tennessee received contributions towards their budgets in consideration of their antimalaria work, which they were expected to emphasize. Perhaps the most intelligent and promising efforts at malaria control in a rural area have been in progress in the counties of western Tennessee.

In Humphreys County, Mississippi, where a representative of the Foundation has served as health officer, a survey of malaria incidence showed a blood index of 1.5 per cent and a spleen

rate of 2 per cent among general population groups of 4,150 and 1,407, respectively. These low rates are in marked contrast to the blood rate of approximately 20 per cent observed in that region ten years previously. Antilarval measures in the towns and screening in the rural sections were promoted in the county during 1928.

Antimalaria Activities and Studies in the West Indies

Jamaica

Malaria Survey.—Malaria has long been considered a serious public health problem in Jamaica. The reported mortality from the disease has been high, and the government has expended large sums each year in treating cases among the poor. Definite information as to the prevalence of the disease was lacking, however, and the government requested the Foundation's cooperation in a survey to determine its incidence and distribution preparatory to undertaking an antimalaria program. Since it was recognized that preventive measures should be based upon a thorough study of the problem, the Foundation provided the services of a malariologist to direct the work and arranged for the training of a local technician in malaria laboratory methods at its malaria training

station in the United States. The Jamaican Government contributed laboratory equipment and the salaries and travel expenses of the assistant director of the survey and two field assistants.

The survey was planned to delimit the areas where malaria constitutes a community problem, to ascertain the anopheles fauna of the island and its general distribution, to determine what species of anophelines are the local vectors, and to formulate a feasible antimalaria program adapted to meet the social and economic conditions of the colony. Since the measurable effects of malaria can be most readily obtained from the child population, spleen and blood examinations were made of random groups in each government-aided school as the means of determining the incidence of the disease.

Beginning at the seacoast the survey progressed inland and towards higher altitudes until, in any direction, two schools gave negative splenic results. Three hundred and forty-nine schools in fourteen parishes were visited during the year; among 9,854 pupils examined for enlarged spleens a rate of 6.3 per cent was found. The examination of blood smears from 4,725 pupils showed a parasite rate of 8.9 per cent. These figures represent the general average for all the schools visited. In some parishes and in certain

areas within the parishes the rates were markedly higher.

According to the results of the survey, it would appear that malaria is only rarely encountered in Jamaica at elevations exceeding 500 feet and that, except in irrigated areas, the disease shows a decided increase during years of high rainfall. The southern part of Jamaica showed foci of high malaria incidence in four parishes: the Plantain Garden River valley in St. Thomas parish, the irrigated regions in St. Catherine and Clarendon parishes, and the Black River valley and Pedro plains in St. Elizabeth parish. A broad zone of lower malaria prevalence was found in the parishes of Westmoreland and Hanover at the western end of the island, and similar small circumscribed areas of low incidence were disclosed on the north coast extending as far east as St. Mary parish, where it is expected that the highest incidence on the north coast will be found.

Breeding-places of mosquitoes were located and carefully mapped. A study of the anophelines secured during the survey disclosed the presence of all four species known to occur in Jamaica, namely, *A. albimanus*, *A. grabhamii*, *A. vestitipennis*, and *A. crucians;* no new species were discovered. Observations point to *A. albimanus* as the most important malaria vector. Plans are being formulated for antimalaria

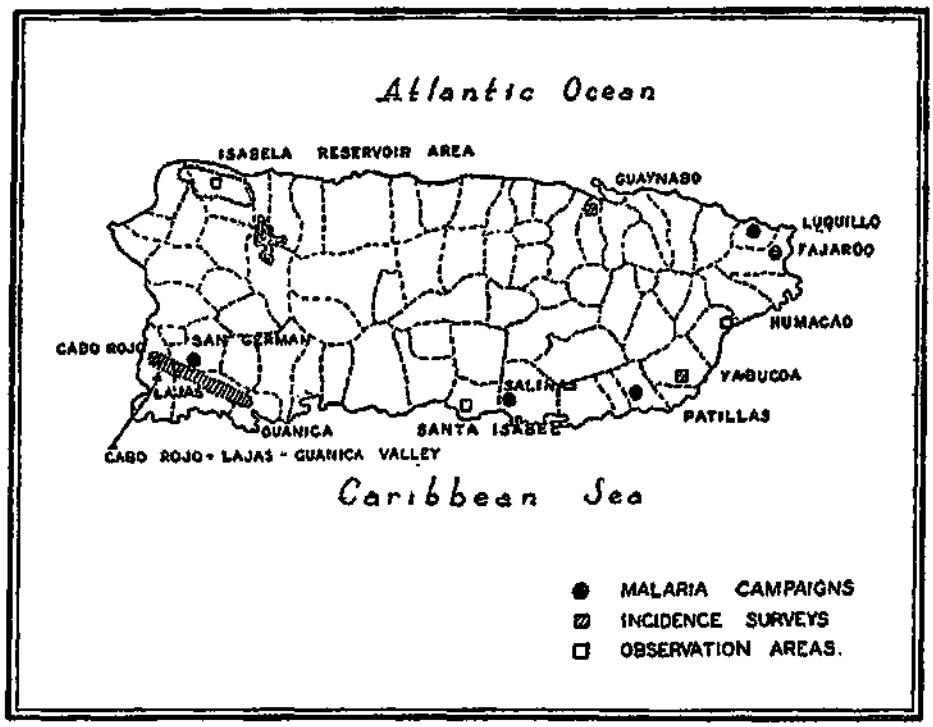
demonstrations in three or four selected areas early in the coming year, and the outlook appears promising for a successful program against the disease.

Porto Rico

Antimalaria Work Extended.—The Foundation continued to lend the services of a malariologist and a drainage engineer to aid the program carried on by the bureau of malaria control in the insular Department of Health in Porto Rico. The government provided $40,000 towards the budget of the bureau, which sum was augmented by funds from municipalities and other sources. The program administered by the government and supervised by the Foundation's malariologist consisted of active antianopheline campaigns, which were continued at Fajardo, Salinas, and Luquillo, and initiated at San German and Patillas; of incidence surveys which were conducted at Yabucoa, Cabo Rojo, Guaynabo, San German, and Patillas; of field experiments in tile drainage by the drainage engineer; of observations at Santa Isabel, Humacao, and the Isabela Reservoir area; and also of a careful study of flooded regions in the Cabo Rojo-Lajas-Guanica valley.

The high rainfall of 1928 hampered antimalaria operations at both Fajardo and Salinas.

At San German and Patillas, on the other hand, the heavy, washing rains were unfavorable to anopheles production in the rivers and creeks, which constitute the main sources of breeding in



Areas of Porto Rico in which the bureau of malaria control of the insular Department of Health conducted work during 1928.

these regions. The measurable effects of the hurricane of September 13, 1928, upon mosquito density and malaria incidence will not be fully known until the coming year. According to general observations, a temporary reduction in mosquito density occurred during the week after the storm, but anopheles production was later increased as a result of the heavy rains accompanying the hurricane. Many pumping stations were unable to function for some time. This

prevented drainage of low regions, with resultant increase in breeding-areas. In numerous swamps where the dense shade had sufficed to prevent heavy *A. albimanus* breeding, the destruction of trees and plants by winds of hurricane velocity produced more favorable conditions for larval development. During a period of six weeks subsequent to the storm, the number of anophelines in the areas under observation reached a peak which had been only rarely attained previously.

Campaign at Fajardo Holds Ground.—In July the antimalaria campaign at Fajardo entered upon its fourth year. Despite the hurricane and the unfavorable distribution of rainfall, the results achieved in anopheles reduction and in low spleen and parasite rates were considered satisfactory. In the zone in which antimosquito measures were conducted 324 cases of malaria were reported during 1928, as compared with 286 cases for the previous year, but the total thus far reported for the last six months of 1928 was less than the number reported for the corresponding period of 1927. In the area serving as a control, where no preventive work was carried out, 222 cases occurred in 1928, a relatively greater increase over the 131 cases reported for 1927. Both the spleen and parasite rates determined in Fajardo for 1928 were higher than the corresponding indices for 1927. These fig-

Photograph Excise

In Porto Rico one mile of irrigation ditching to every acre of land planted with sugar-cane increases the potential breeding-places of anopheles mosquitoes.

Tile drainage reduces the number of surface ditches required and is also proving a most promising solution of the problem of mosquito breeding in seepage areas and wet lands in Porto Rico.

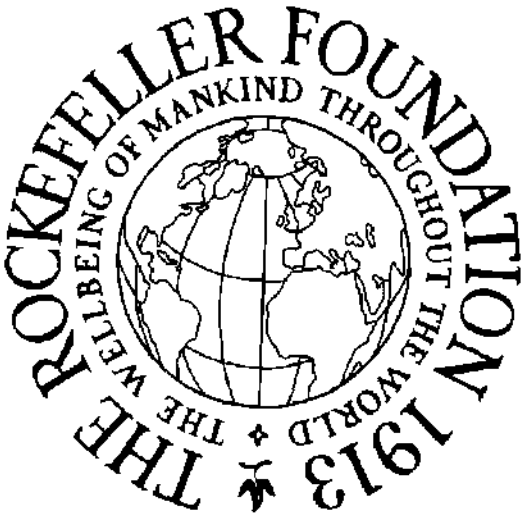
Photograph Excised Here

Photograph Excised Here

Tiles manufactured in Porto Rico for the subsoil drains which are being installed in connection with antimalaria work. Local manufacture of the tiles greatly reduces the cost of the drainage projects.

ures, however, showed an increase both within and without the protected zones; and it was concluded that the advantage gained by the antimalaria program had been at least maintained under very difficult conditions in an area where a high rainfall prevails and anopheles breeding takes place twelve months in the year.

Subsoil Drainage Recommended for Salinas.—In Salinas, where the first year of antimalaria work was completed in May 1928, the malaria problem is one of the most difficult encountered on the island and is fairly typical of conditions on the southern coast. In spite of the fact that during the year 1928 conditions were particularly adverse, with as many as 800 acres continuously wet with seepage water for as long as three months at a time, there was no marked increase in malaria, and the total number of cases reported for the last six months of the year was appreciably lower than that for the corresponding period of 1927. The results of the spleen and parasite examinations at Santa Isabel, control area for Salinas, will not be available until later. In view of local conditions, which make the cost of antilarval measures considerable, it is believed that tile drainage is a prerequisite for malaria prevention in a region like Salinas. Funds are now available for undertaking this type of drainage, and with the



Photograph Excised Here

Aeroplane view of part of the Medemblik area, province of North Holland, where the Rockefeller Foundation is assisting in field studies of the comparative value, in antimalaria work, of certain larvicides, chiefly liquid paraffin and Paris green.

Photograph Excised Here

Applying liquid paraffin to a drainage ditch in the Medemblik area to eliminate mosquito breeding.

cooperation of property owners and the municipality adequate subsoil drainage should be accomplished within a period of four to five years.

Paris Green Is Successful at Luquillo.—The second year of the antimalaria campaign in the town of Luquillo was devoted chiefly to applying Paris green as a larvicide in a surrounding zone with a radius of one kilometer. Quinine was available to those who desired it, but no effort was made to secure its prolonged use on the part of the population. As there are no adjacent areas requiring major drainage, it is believed that anopheles breeding can be successfully and economically controlled by means of Paris green until it is possible to eliminate the breeding areas by minor drainage.

Campaign Undertaken in San German.—In April 1928 a campaign against malaria was begun in San German, a town of about 6,000 inhabitants, in the foothills in the southwestern part of the island. A severe epidemic of the disease had prevailed for several months, and in March 1928 a spleen rate of 33 per cent and a parasite rate of 28 per cent were found. Since this town is many miles from the ocean and lowlands, the problem was somewhat different from that of the other regions in which malaria campaigns were conducted and centered about the control of heavy *A. albimanus* breeding in the

river and creeks. Paris green was employed with marked success; the number of reported cases was reduced from 496 in April to twenty in December. It is expected that a successful campaign can be continued at a low cost.

Program Initiated at Patillas.—At the request of the local authorities, a survey of malaria conditions was made in Patillas, a town on the southern coast, with a population of approximately 2,000. Patillas has suffered severely from malaria, and at the time of the survey a spleen rate and a parasite rate of 36 per cent were disclosed. Local support was secured towards a campaign which was initiated in August 1928. Although the rainfall of 1928 was greater than that of 1927, the heavy rains were generally favorable to the campaign. All indications point to the successful control of anopheles breeding in the creeks and the river at a low cost by the use of Paris green.

Hurricane Affects Conditions at Humacao.—Observations were continued in the area in which pumps are employed for drainage purposes. Up to the time of the hurricane these worked efficiently and maintained a low water level. The village of Humacao suffered greatly from the hurricane and of all the areas under observation experienced the greatest increase in malaria following the disaster. The disease

reached epidemic proportions there in November, but at the end of the year mosquito density as well as malaria incidence showed a rapid decline.

Additional Areas Are Surveyed.—Interest in antimalaria work is rapidly growing in Porto Rico, and an increasing number of applications for campaigns against the disease have been received by the bureau of malaria control. Malaria conditions in the towns of Cabo Rojo and Yabucoa were studied at the request of local officials, but the results of the surveys did not seem to warrant extension of the campaign to these areas at the present time. At the request of the Commissioner of Health of Porto Rico, a study was made of an area in the municipality of Guaynabo, which was one of the remaining foci of malaria adjacent to the city of San Juan. As the result of finding a spleen rate of 23 per cent and a parasite rate of 22 per cent, plans have been developed to drain extensive flooded areas in mangrove swamps and bordering pasture lands. A careful study of conditions in the fertile valley extending from Cabo Rojo eastward to Guanica showed malaria to be a serious problem, the solution of which is dependent largely upon adequate control of flood waters. Recommendations were made for a further study of the problem by a drainage engineer.

Isabela Reservoir under Observation.—A further

investigation of both the Isabela reservoir region and the irrigated area showed that no breeding had taken place in the reservoir and no increase in malaria had been reported. Although irrigation has been extended, the canals are well maintained and the water efficiently handled by irrigation gates.

Extension of Tile Drainage.—The study of drainage problems by an engineer experienced in this specialty, whose services have been furnished by the Foundation, has been an important contribution to the antimalaria program being developed in Porto Rico. During 1928, under his direction, field experiments in tile drainage were continued at Fajardo and begun in other areas on the east and south coasts. At Fajardo, where drainage is difficult because of the character of the clay soil, tile drainage was installed in three fields, one of which was so wet that it was useless for agricultural purposes. Subsequent to tiling, this area was free from standing water for the first time since the campaign against malaria was started there in 1925, and it remained practically dry throughout the rainy season. Similar measures were undertaken in a field of dense clay at Juncos, in two areas at Humacao, and in three small fields at Santa Isabel on the south coast. Some striking results as to the value of subsoil drainage were secured at Humacao, where five

days after the hurricane the tiled area was sufficiently dry to permit ploughing and within a week was free from water, while the adjacent untiled land was too wet to plant.

The engineer assisted private corporations who are developing this type of permanent drainage and also investigated the possibilities of such measures at Salinas, Aguirre, and Ponce. The results of the field demonstrations thus far conducted have indicated that where soil conditions will permit its use, subsoil or tile drainage is the most promising solution of the problem of mosquito breeding in seepage areas and in wet lands which are not too low. Furthermore, this method of drainage is useful from an agricultural standpoint in reclaiming waste land, reducing the number of surface ditches, and increasing the yield of land already under cultivation. The local manufacture of the tile in Porto Rico has served to reduce the cost of the work and to bring it within the financial resources of the various communities.

Special Training for Malaria Service.—Since trained personnel is essential to the extension of antimalaria work in Porto Rico, the Foundation has granted fellowships to a Porto Rican engineer who is being trained in the United States in methods of agricultural drainage, especially tile drainage, and to a local university graduate

who is receiving special instruction in medical entomology.

Antimalaria Activities in Central America Are More Carefully Studied and Applied

In recent years the Foundation has given no financial aid towards the antimalaria programs that are being developed by various governments in Central America, but it has continued to make available the services of field representatives who have assisted the national departments of health in stimulating and organizing this work. Emphasis has been placed on the importance of establishing control areas to measure the efficacy of antimalaria activities. Prior to and at regular intervals during the campaigns, surveys to obtain spleen and blood indices, not only for a group which lives in the district where work is carried on but also for one in an adjacent area where no antimalaria measures are in operation, have been encouraged. A comparison of the indices of these two groups makes possible an evaluation of the measures employed and points the way towards sound progress.

Costa Rica

Demonstration Campaign Begun.—In Costa Rica labor migrations to the fruit plantations on the coast have caused a marked increase in

malaria in the interior when the laborers returned to their homes there. To combat this problem, the government approved a comprehensive program against malaria and voted funds for the work. The Foundation provided financial aid towards a demonstration of antilarval measures to be carried on during a six-month period beginning November 15, 1928. It is planned to have the supervisor of permanent drainage measures in the Panama Canal Zone direct operations in an area which includes the towns of Puerto Limón, Turialba, and Orotina. Personnel will be trained locally, and the government will assume the permanent support of the campaign at the close of the Foundation's cooperation. Before the end of the year malaria surveys were undertaken at Turialba and Orotina by the division of sanitary engineering of the Ministry of Health and a mala. . ı reconnaissance was made of the unsanitated section of Puerto Limón and adjacent villages preparatory to commencing definite drainage operations and antilarval measures.

Honduras

Antimalaria Program Reorganized.—In Honduras antimalaria work is now a function of the division of tropical diseases, which was recently established to combat such endemic diseases as hookworm and malaria. During

1928 a former Foundation fellow was placed in charge of this division. Efforts were directed towards reorganizing the malaria program along scientific lines, and demonstration areas are being established with proper controls to determine methods which are suitable to local conditions and are economically feasible. Extensive antilarval operations were conducted in a number of departments, and malaria treatments were administered at almost all the hookworm dispensaries during the malaria season. Paris green continued to be the most successful larvicide. The Health Department cooperated with several large fruit companies by training personnel for malaria work on the plantations on the north coast. Antilarval operations were carried on with success in the Tela area in the province of Atlantida, where campaign expenditures have been more than justified by a reduction in hospital costs of malaria cases.

Nicaragua

Antilarval and Drainage Measures.—Active antilarval campaigns were maintained by the national Department of Health in the principal towns in the western part of Nicaragua along the Pacific coast and were extended to a number of new areas. While permanent measures have been developed in Rivas, Corinto, and

certain sections of the capital city of Managua, the antimalaria operations elsewhere have been for the most part temporary in character. Paris green has been used successfully. Where funds are available, preparations are under way to install permanent tile drainage, which will be financed by the municipalities. Antimalaria work will form an essential feature of the campaign of rural sanitation recently organized on the east coast of the republic. Drainage measures were instituted at Bluefields, where an intensive campaign against malaria will be financed by the municipality with some aid from the national Health Department. As the result of experiments in the distribution of Paris green by airplane near Managua, this method will be employed to aid in reducing anopheles breeding in the community.

Panama

Permanent Drainage Installed.—In Panama the responsibility for the antimalaria program rests with the division of sanitary engineering. In cooperation with this division some interesting work was undertaken by the Canal Zone Health Department to control anopheles breeding in San Francisco de la Caleta, a suburb of Panama, which, as a source of malaria infection, was a menace to residents of Panama and

the Canal Zone. The permanent drainage which was installed is of the double-decker type and consists of a line of subsoil tiles with a superimposed paved surface drain. This system is functioning successfully and has transformed the area from an impassable bog to a well-drained community. The drainage operations which were carried on in the village of San Juan near Panama city have greatly reduced anopheles breeding and fever incidence in that area. In order to reduce malaria among rural school children, quinine was sold in the schools by the section of school hygiene at a very small cost and pamphlets on the prevention of malaria were distributed.

Salvador

Work in San Salvador.—The Foundation's representative in Guatemala supervised the malaria survey and the antilarval work which were begun during the year in the city of San Salvador, the capital of Salvador. Spleen and blood examinations were made among school children, some drainage operations were undertaken by property owners, and Paris green was successfully employed as a temporary measure.

Cooperative Efforts in South American Countries

Argentina

Demonstrations in Northern Provinces.—During 1928, the third year of the Foundation's

collaboration with the Government of Argentina in a campaign against malaria, 70 per cent of the total budget for this work was provided by the government. Demonstrations were continued in the northern provinces of Tucumán and Jujuy. In general, drainage operations seemed to be the most satisfactory antimosquito measure in both provinces. New ditches totaling 4,400 meters were dug, and 11,000 meters of old ditches were cleaned, deepened, and straightened. Subsoil drainage was found to be particularly effective in the Concepción-La Corona area in the province of Tucumán despite prolonged rainfall; more than 2,200 meters of subsoil tiling were laid or repaired.

In the province of Tucumán, anophelism and monthly fever rates remained low in both the Concepción-La Corona and Medinas-La Trinidad areas. The blood indices, too, remained at low level except in Medinas, and it is believed that the malaria occurring there is contracted outside the zone of campaign operations, which is relatively small and surrounded on all sides by highly malarious communities. The same success has not yet obtained at Ledesma in the province of Jujuy where work is handicapped by the transient character of the population. Because flight experiments in Ledesma and Concepción showed that *A. pseudopunctipennis* was

capable of flying a distance of at least four kilometers in numbers of importance, it was necessary to extend the zones of antimalaria operations to prevent these long-distance invasions of the communities. The rapid surveys made in the Metán and Orán areas in the province of Salta seemed to indicate that the malaria problem was not sufficiently severe in these communities to warrant a special campaign against the disease. At the request of the local health officials, field personnel were assigned to the city of Jujuy, the capital of the province of the same name, to assist in developing antimalaria operations.

The investigation of field problems was an important feature of the cooperative program during the year. Besides the flight range experiments in Concepción and Ledesma, observations on the comparative value of petroleum and Paris green as larvicides and a study to determine the possible relationship of rice cultivation to malaria incidence in the province of Tucumán were made. By reason of local conditions petroleum was preferred to Paris green as a larvicide, although the cost of application was greater in the case of the former. The findings thus far secured have led to the conclusion that *A. pseudopunctipennis*, which transmits malaria in Northern Argentina, does not breed in the rice

fields of Tucumán and that rice growing has played no part in the malaria problem in this province.

Because of the expense of employing full-time medical men it has been necessary to place greater responsibility upon the non-medical personnel of the malaria service. With this end in view, chief inspectors were selected from the regular staff, given intensive training in elementary parasitology, entomology, engineering, and general administration of antimalaria work, and then placed in charge of individual posts.

Brazil

State of Rio de Janeiro Continues Antimalaria Measures.—At the beginning of 1928 the malaria service of the state of Rio de Janeiro was incorporated in the state Department of Health. The Foundation's cooperation in the malaria program, which has been carried on in selected areas for several years, was continued. During 1928 greater attention was given to the maintenance of permanent drainage. In Itaperuna, Capivary, and Macahé, subsoil drainage was installed in many places where the maintenance of surface ditches proved unduly expensive.

In the seven areas where antimalaria operations were carried on, a general reduction in anopheles breeding and malaria incidence was reported. No malaria cases were reported in

Itaperuna during 1927 or 1928, and marked reductions in the number of cases occurred in Queimados, Capivary, and Conceição de Macabú. Field work was completed in two areas and a preliminary survey was undertaken in Carapebús.

Venezuela

Malaria Survey and Control.—The malaria survey which was begun in Venezuela in February 1927, in conjunction with the hookworm infestation study, was completed in March 1928. (See map, page 160.) The Lake Valencia region, particularly at Maracay, was studied intensively during the entire year. Reconnaissances were made in other areas where the hookworm survey was in progress and consisted largely of spleen examinations of both children and adults, together with blood tests in the majority of cases. During the survey period approximately 3,500 spleen and 3,000 blood examinations were made. An analysis of the findings showed that malaria of a severe type is widespread in the plains (llanos), while almost similar conditions prevail in the lower Yaracuy valley. The disease was found to be prevalent in the Lake Maracaibo district, with more serious conditions southward from the city of Maracaibo. There is practically no malaria in the Carácas valley or in the coastal region in and

near La Guaira. In certain sections of the Lake Valencia basin, it was found in epidemic form.

The city of Maracay and the surrounding territory within a radius of approximately three kilometers from the center of the city were included in the area to be intensively studied over a period of one year. Meteorological observations were taken, a spleen and blood survey of school children and adults was accomplished, histories of malaria cases seen by local physicians were secured, and observations were made on anopheles breeding, adult density, and natural and experimental infection of anopheles; house-to-house searches for malaria cases were also conducted during the malaria season. Sixteen species of anopheles are now known in Venezuela, but it is not yet certain which species are the vectors of malaria. It is probable that several species in different parts of the republic will be found to transmit the disease.

Antimalaria measures were undertaken in Maracay by the local health authorities shortly after the beginning of the survey; the work was supervised by the Foundation's representative. Paris green was used, supplemented by minor drainage. The survey of Maracay proved to be more of a check on the antimalaria operations than a preliminary measure of the incidence of the disease.

It was not necessary to employ quinine dispensers during 1928 as relatively few cases of malaria were found in the area where the campaign was in progress, although outside this area the number of cases often reached epidemic proportions as in former years. Some interesting observations were made on the breeding of anopheles larvae and their emergence in spite of control efforts.

As a result of the recommendations for a permanent antimalaria program in Maracay which were offered to the government at the conclusion of the survey, the extensive pasture lands surrounding the city are being reclaimed for agricultural purposes and a more careful method of disposing of excess water from artesian wells and irrigation ditches is being developed. The Foundation's representative also made a study of the sewer system of Maracay with a view to improving conditions by consolidating and eliminating numerous outlets which constitute anopheles breeding-places.

Careful Studies and Controls Are a Feature of Antimalaria Programs in Europe

Bulgaria

Survey in Department of Petritch.—To assist the Government of Bulgaria in securing further

information upon the epidemiology of malaria in that country and to establish exact data regarding the value of antimalaria operations, the Foundation agreed to support for a period of at least three years, a station for field studies in malaria in the department of Petritch, which is situated in the southwestern part of Bulgaria near the borders of Greece and Yugoslavia. According to the terms of the agreement, a representative of the Foundation, experienced in malaria work, will supervise the organization and program of the station, which is an integral part of the malaria inspectorate, or national malaria service. The government is providing a resident director at the station and a building to serve as laboratory and living quarters for the personnel. In the Petritch area, where there are mountain streams, a sluggish river with tributaries, rice fields, small lakes, and marshes, a variety of problems exist. Two species of anopheles abound, namely, *A. superpictus* and *A. maculipennis*, a combination occurring rarely in other malarious regions of Bulgaria, where, in general, only one species of anopheles mosquito is found and only one type of malaria problem is encountered.

The year 1928 represented a period of preliminary observation to determine the malaria incidence and the extent and nature of anopheles

breeding-places. To this end a member of the Foundation's field staff conducted a series of observations on spleen and blood indices and anopheles density and breeding habits in seven villages in the Petritch area.

An examination of the population for the presence of malaria was made in April and May before the period of active malaria transmission began and thus indicated the amount of residual malaria in the seven villages. Permanent catching stations for adult mosquitoes and larvae had been established in each village; during the summer, studies of anopheles breeding and prevalence were conducted throughout the area. Acute attacks of malaria were recorded in August and September. Spleen and blood examinations were made again in the latter part of October after the malaria season. A comparison of the results of these two surveys is important in that it shows the change brought about by a sharp outbreak of the disease in a population in which malaria is highly endemic. General parasite rates of 25 per cent and 62 per cent and general spleen rates of 67 per cent and 85 per cent, obtained in the spring and fall respectively, gave unmistakable evidence that malaria is a serious public health problem in that region of Bulgaria. The information which was carefully and accurately collected during 1928 will form

the basis for a demonstration antimalaria campaign during the coming year. The station will also serve as a training base for practical field work to supplement the courses offered at the Institute of Malaria at Burgas.

Italy

Antilarval Measures Extended.—For the past four years the Foundation has collaborated with the Government of Italy in operating a malaria experiment station for the study and prevention of this disease. This station is now an integral part of the national Health Department, but a representative of the Foundation still serves as adviser on the development of its program. During the past year the station continued antimosquito demonstrations, field experiments and observations, training of personnel, and research, in twenty-five malarious communities throughout the country. In addition to the central office and laboratory at Rome, there were five regional stations, thirteen field study areas, four communities which were observed as controls, and two large towns in which antilarval campaigns were supervised. The only new area entered in 1928 was Biella, a town in the rice-producing regions of Northern Italy.

Results Conclusive at Porto Torres Station in Sardinia.—The most dramatic results ob-

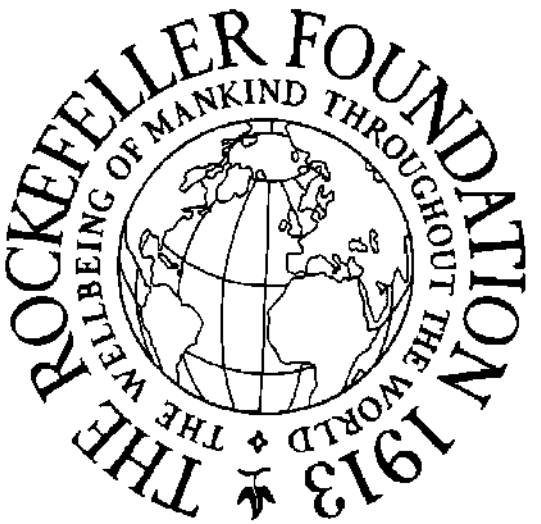
tained at any of the field stations have been those achieved at Porto Torres in Sardinia. The work

Localities in which the Malaria Experiment Station of the national Department of Health of Italy carried on work during 1928.

there has been an important demonstration, because each year since the establishment of the

station in 1925, antimosquito measures have been more efficiently conducted than in the preceding year in spite of difficulties, and the zone of operations has been extended without increased cost. The effect of preventive measures on the endemicity of malaria during the past four years is shown by the reduction in the parasite index from 34 per cent in 1924 to 3 per cent in 1928, in the spleen index from 47 per cent in 1924 to 13 per cent in 1928, in the number of reported cases from 1,300 in 1924 to less than 200 in 1928, and in the infant infection rate from 4 per cent in 1925 to less than 1 per cent in 1928. Although all other towns in Sardinia reported increased malaria in 1928, Porto Torres has continued to progress steadily toward the elimination of this disease; both anopheline density and the number of new and relapsing cases of fever were reduced during the past year to less than one-half the numbers reported for 1927.

Two communities, Lodé and Orosei, in which no antimalaria work was carried on, were selected as control areas for the work at Porto Torres. The two adjacent villages of Torpé and Posada, in which a field study of intensive quininization was continued, served also as partial controls, since this area offered an opportunity to determine anopheles production under natural conditions. The work of the malaria experiment



Photograph Excised Here

Equipment employed by the Malaria Experiment Station of Italy for mixing and distributing Paris green. During 1928 similar equipment was secured by thirteen national health administrations throughout the world for use in their antimalaria campaigns.

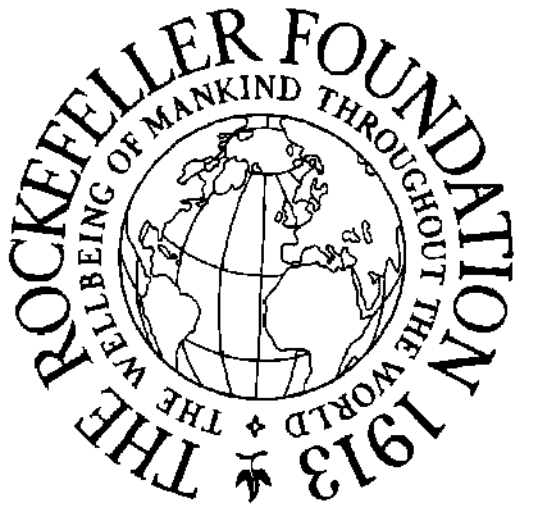
Photograph Excised Here

Paris green has proved a successful weapon in the campaign against malaria in Sicily, which was the first local government of Italy to organize antilarval measures.

station in Sardinia has stimulated the provincial authorities to secure training in antilarval methods for local personnel in order to extend the campaign to other communities.

During the past three years the Porto Torres station has also carried on a comparative study of the effects of long and short courses of quinine treatment on chronic malaria patients protected from reinfection. A special report on this study will be issued later by the station. The preliminary results indicate that the number of relapses following eight weeks of quinine treatment is only slightly less than in the series in which treatment was limited to the febrile period. Supervision of other field experiments in the near-by villages of Oschiri, Terranova, and Siniscola was continued.

Successful Antilarval Measures in Sicily.—The malaria field station in Sicily is located on the outskirts of the city of Catania. The antilarval campaign continued to be successful, and in 1928 no primary cases of malaria were reported in any part of the protected area, which included an aviation camp of several hundred men and a summer colony of 100 city children visiting the area for the first time. On the other hand, the official records of a near-by town showed that 80 per cent of the population of about 6,000 suffered from malaria.



Photograph Excised Here

Paris green dusting by aeroplane on the shores of Lake Managua, Nicaragua, is a feature of the government antimalaria program.

Photograph Excised Here

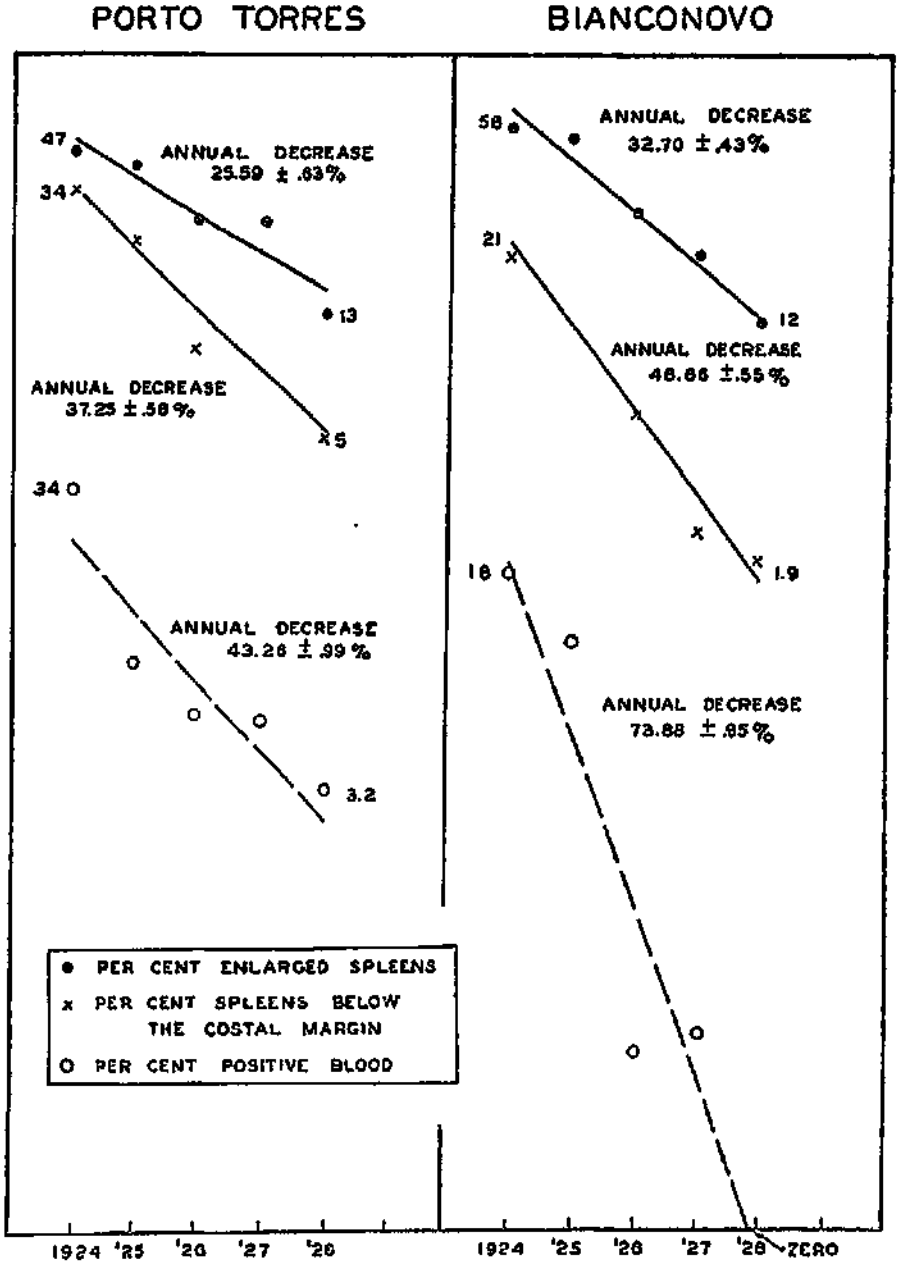
Inspector distributing Paris green in Ceylon, where this larvicide was used in four areas selected by the government for antimalaria operations in 1928.

A well-kept drainage ditch in the province of Salta, Argentina. No anopheles larvae were found in canals of this type during a malaria survey of the province in 1928.

In Sicily, which has 370 communes and a population of over four millions, antilarval work has been definitely organized as a part of the local government program of malaria activities. This program provides for major engineering works (grande bonifica) and antilarval measures (piccola bonifica); the latter will be employed temporarily in areas where drainage systems are to be installed, and permanently where such measures are inapplicable. The Catania station has been used as a training base, with a secondary training area at Caltanissetta. Training in the general principles of entomology and distribution of larvicides was provided for 191 persons in 1927 and for 200 persons in 1928. By the close of 1928 antilarval operations had been organized by the local governments in 110 areas in the seven provinces of Sicily; the program included the use of Paris green and gambusia. Health education was carried on in the schools and towns by means of traveling cinemas and the distribution of literature.

Malaria Is Being Eliminated in Areas of Southern Italy.—The antilarval campaign in Calabria in Southern Italy has been successful. When the regional station at Bianconovo was established in 1925, a spleen rate of 56 per cent existed among the children, which was reduced to 12 per cent in 1928. The parasite index

dropped from 18 per cent in 1925 to zero during the past year; the infant infection rate has remained at zero for three consecutive years.



Trend of malaria parasite rates and spleen rates in Porto Torres, Sardinia, and Bianconova, Italy, during the five-year period in which antimalaria work has been in progress, plotted on semilogarithmic scale.

During 1928 both endemic and epidemic malaria were entirely eliminated in the protected zones; no sporadic cases were reported and the number of relapses dwindled practically to zero. In 1924 the local dispensary treated 518 persons for acute attacks of malaria; in July 1928 this institution closed its doors since, among the population of 6,000, there had been no persons requiring medication from July 1927 to June 1928. This step meant a saving of approximately 15,000 lire, whereas the maximum cost of the antilarval campaign was about 9,000 lire annually. In Bianconovo as well as in Porto Torres a generation is growing up which has never experienced malaria.

In four near-by villages—Bova, Bovalino, Brancaleone, and Palizzi—antilarval measures have been applied under the general supervision of the Bianconovo station. With the exception of a sporadic case or two, malaria has disappeared from these villages. At the close of 1929 the work will be assumed by the government. Antimosquito measures have already been extended to a number of other towns by the medical officer of the province.

Work in Vicinity of Rome.—Although the antimalaria campaign in the town of Sermoneta on the edge of the Pontine Marshes has not attained the complete success achieved at Bianconovo, the malaria reduction is the more sig-

nificant owing to the former intensity of the disease. Only seventy-two cases were treated at the local dispensary throughout the year as compared with 791 cases in 1924. During the last three years the population of the town has begun to show an increase after remaining stationary or decreasing for more than six centuries. The antilarval work of the field station has attracted considerable attention because of the proximity of the city of Rome. The studies of the value of radiotherapy in chronic malaria which were undertaken in this area have been concluded and will be reported after the data have been analyzed.

Fiumicino, a town situated in the delta of the Tiber river, represents the only area in which there were more new cases of malaria in 1928 than in the previous year, and this increase was the result of extensive mosquito breeding in an unobserved seepage area. Thirty-two new cases were reported as compared with nine in 1927. But this condition was not reflected in attendance at the dispensary, and the number of cases of estivo-autumnal malaria continued to decrease. The reduction in malaria in Fiumicino during the past four years has been attributed to the greater efficiency of Paris green as compared with oil, which was formerly employed as a larvicide. Two villages, Ardea and Fondi, in

which no antimalaria work was undertaken, served as controls to evaluate the operations in the region about Rome.

Malaria has been definitely reduced during the past three years in the Valchetta, a suburban sector just outside Rome, by the regular use of Paris green and by the screening of houses. Improved health conditions have brought about an increase in the permanent population in this formerly sparsely inhabited district. Despite the fact that the malaria problem is complicated by a considerable mobile population from malarious zones, who are subject to acute attacks of malaria acquired elsewhere, no new cases were reported in the protected zone during the year.

At the request of the local authorities, the experiment station organized and directed an antilarval campaign to protect the town of Terracina which is located at the southern end of the Pontine Marshes. During 1929 an experiment in house screening will be initiated in one section of this town.

Studies and Programs in Northern Italy.—Under the direction of Professor Ottolenghi of Bologna, field studies to determine the relation between malaria incidence and land reclamation through major drainage were continued in Ferrara in the delta of the Po River. Among the significant findings of these investigations

has been information concerning *Anopheles elutus*. This species is very numerous in the more intensely malarious zones, and its larvae are able to develop in more brackish waters than the larvae of *A. maculipennis*. It is suspected that *A. elutus* may have a greater responsibility for the malaria in the region of the Po delta than *A. maculipennis*, which is believed to have little or no contact with man.

At Rovigno in the Istrian peninsula studies relating to the biology of gambusia and its influence upon malaria incidence over a period of years were continued under the direction of Professor Sella. In this area the large number of lime sinks or small ponds creates a special malaria problem which offers an admirable opportunity to test the efficacy of gambusia. The promising results thus far secured in malaria reduction have led to the development of a provincial program of antilarval work by fish control supplemented by the use of Paris green. *Gambusia petruelis* has been introduced in the hope that this species may survive the cold winters of Northern Italy better than the gambusia originally brought by Grassi from Spain. The training of local personnel is being arranged, and by the close of 1928 operations against anophelines had been organized in eight of the principal towns. As a result of the field work in this region

a preventorium for children was kept open throughout the summer of 1928 without the occurrence of a single malaria infection among the patients.

A study of the gradual disappearance of malaria in the rice-producing regions in Northern Italy was begun in the town of Biella in the valley of the Po River. It is proposed to determine whether the amount of contact between anophelines and man has been responsible for this decline in malaria. Observations will be conducted by means of monthly visits from the central office at Rome.

In accordance with a three-year program undertaken in 1927, the experiment station continued to direct an antimalaria campaign which is being conducted in Monfalcone, at the expense of the local government. The distribution of Paris green by airplane over extensive marshes adjacent to the town was more effective in 1928 than in the previous year; several hundred small breeding-places were permanently eliminated by filling operations, and Paris green was sprayed by hand upon canals and ditches. Anopheles density in the protected zone showed a notable reduction as compared with 1927; the number of primary cases was reduced from 273 in 1927 to twenty-eight in 1928; and the relapses dropped from 2,262 in 1927 to 712 during the past year.

Malaria Research.—Malaria research continued to be an important function of the experiment station and included clinical, entomological, protozoological, and general biological studies, as well as observations on treatment. New investigations undertaken during the past year comprised a study of induced malaria in the treatment of general paralysis, the development of a modified technic for use of the precipitin test to determine the origin of anopheles blood meals, a study of the hemosporidia of birds, and an investigation of the hydrogen ion content of water and its relation to the development of anopheles larvae, and other special studies to which previous reference has been made.

Influence of the Experiment Station.—The rapid development in Italy during the past two years of state agencies for the prevention of malaria through antilarval measures may be reasonably ascribed to the results achieved by the regional demonstrations and field studies carried on by the malaria experiment station. Interest in these antimalaria methods is gradually extending beyond the boundaries of Italy, as shown by the fact that sixty-eight persons from twenty-seven foreign countries visited the malaria experiment station in 1928; that representatives of thirteen foreign countries have purchased the antilarval equipment employed in Italy, which

was also sent by request to ten cities and towns in India, and that 106 persons from thirty-one foreign countries spent some time in study and observation of the methods and organization of the central station and its field divisions.

Albania

Antimosquito Measures Continued.—The malaria experiment station in Italy assisted the Government of Albania in antimosquito measures which were started in the city of Durazzo in 1927. At the request of the Albanian authorities, practical field training in malaria was provided for two physicians who were sent to Italy for this purpose.

The Netherlands

Studies in North Holland.—For the past two years the Foundation has given financial aid to the malaria field studies which have been conducted at Medemblik in the province of North Holland, under the direction of Professor N. H. Swellengrebel, for the purpose of evaluating the effectiveness of larvicides in reducing anopheles density. The use of Paris green and liquid paraffin was continued during the 1928 season. The year was marked by increased anopheles breeding but by a further reduction in the low malaria incidence in the zone of opera-

tions. Since there was also a reduction in malaria cases in other malarious regions of North Holland where no antilarval measures were carried on, Professor Swellengrebel has been very conservative in his conclusions. He believes, nevertheless, that the antilarval activities during 1928 had a definite influence in the reduction of malaria cases in Medemblik. The detailed observations which have been so carefully made in that area have contributed further interesting information on the ecology of anophelines and practical data on the application of larvicides.

To permit a satisfactory demonstration of the value of Paris green in the Netherlands and to develop a broader program of antimalaria work involving entomological and historical epidemiological studies, the Foundation agreed to continue support toward this program over a period of five years beginning January 1, 1929.

Spain

Campaign in Province of Cáceres.—In Spain the highest malaria incidence is found in the province of Cáceres, where the work of the Malaria Commission of the National Department of Health continued to receive support from the Foundation. Antimalaria measures were conducted in the province by ten field laboratories and the malaria field station for research and

training, which has its headquarters at Navalmoral de la Mata. Paris green, which was sprayed by hand every ten days, was widely used, both alone and with gambusia, to control anopheles breeding. The antilarval campaign of the malaria field station was extended to a distance of three kilometers about the towns of Navalmoral de la Mata, Peraleda de la Mata, and Miajadas, and to a distance of two kilometers around Talayuela. The capture of anophelines as a check on the effectiveness of the campaign was an important feature of the work.

Quinine was administered to persons suffering from malaria. Field observations relating to the efficacy of certain quinine substitutes were conducted by the station; studies on the biology and habits of *A. claviger* and *A. bifurcatus* under natural and experimental conditions were begun; experiments were undertaken to determine the relative value of various larvicides; and epidemiological surveys were accomplished. Each year an increasing number of physicians from other countries have come to the malaria center at Navalmoral to study the methods employed there. The mobile laboratory service which has been active in the mountainous area of Jerte was further extended, and studies on the treatment of the insane by induced malaria were begun in the provincial hospital.

During the year the Malaria Commission assigned a malariologist to the hookworm laboratory at the village of De Soto in the province of Murcia to cooperate with the hookworm personnel in initiating a campaign against malaria. The examination of more than 3,000 blood specimens showed a malaria incidence of 63 per cent.

Malaria Programs in the East

Ceylon

Work in Four Areas.—Representatives of the Foundation were able to be of service to the government malaria organization in Ceylon in entomological investigations and drainage operations. Two former Foundation fellows are associated with this work. During the year the government selected four areas in Eastern, North Central, and North Western provinces as centers for antimalaria activities, namely, Anuradhapura, Chilaw, Kurungala, and Trincomalee. Plans for more extensive drainage projects were prepared, and the distribution of Paris green as an antilarval measure was introduced. As the result of extensive observations on the transmission of malaria, which have been carried on by the government medical entomologist and a Foundation representative, *A. culicifacies* has been definitely incriminated as the principal

malaria vector in the dry zone up to an elevation of 1,000 feet.

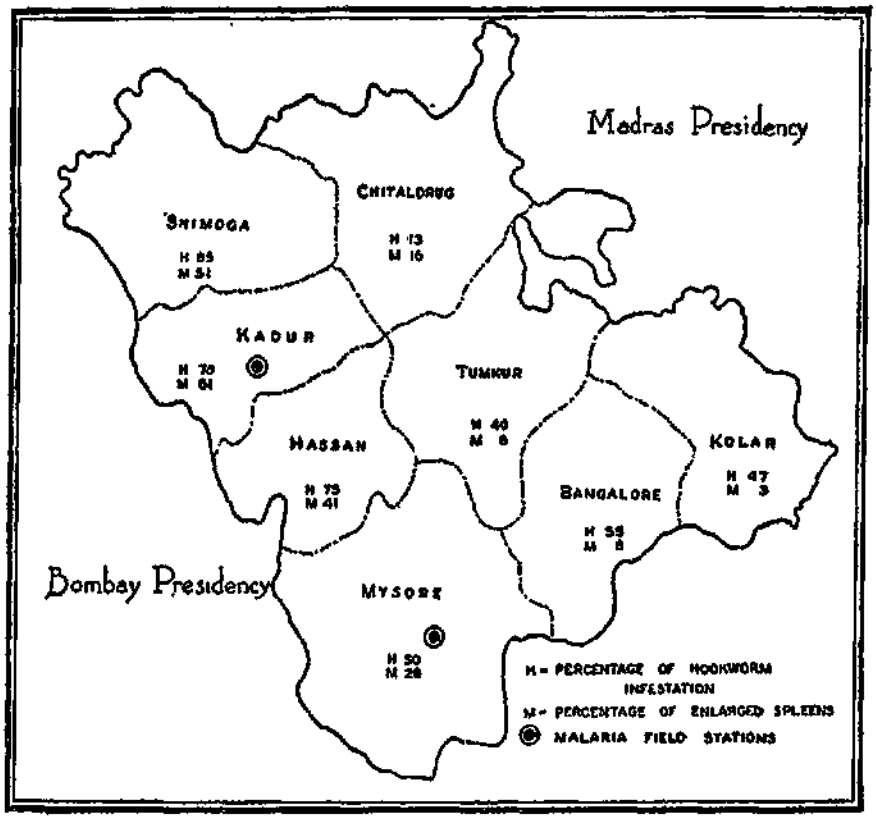
Practical instruction in antimalaria work was offered during the year. The Foundation's sanitary engineer gave a course in field sketching and the elementary principles of antimalaria engineering to medical officers of health of the government malaria campaign, while a government official completed a series of lectures and demonstrations for aspirants to the post of sanitary inspector.

State of Mysore, India

Malaria Field Stations Established.—One of the most important phases of the public health survey of the state of Mysore, which was begun by a member of the Foundation's field staff in 1927, was a reconnaissance to determine the malaria incidence. A spleen survey of more than two hundred communities in eight districts of the state disclosed an average spleen rate of 36 per cent among 8,143 school children. Malaria was found to be practically universal in the districts of Mysore, Kadur, Shimoga, and Hassan, where it is believed to constitute the chief cause of disability and death among the population.

In 1928 the Foundation approved a cooperative program to assist the Government of Mysore

in developing an improved health organization. According to its provisions, the Foundation agreed to contribute funds over a two-year period



Incidence of malaria and hookworm disease disclosed by a public health survey of the state of Mysore, India, 1927–1928, by districts.

towards the operation of malaria field stations in the state. At these centers efforts will be directed towards defining the malaria problem before undertaking organized antimalaria work. The first field station was opened in October in the Nagenhalli area at a location four miles from the city of Mysore. Three adjacent villages will serve as control areas. The second malaria sta-

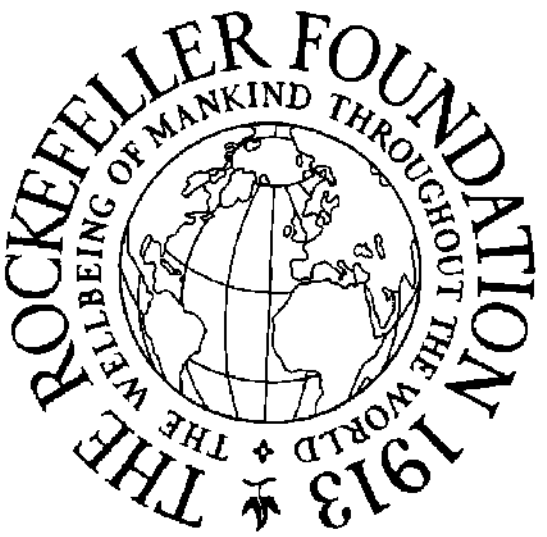
tion was established in December at Mudgere in the Kadur district, and arrangements were completed for the opening of a third station at Hiriyur in the Chitaldrug district early in 1929.

The area covered by each station is divided into two zones, a central zone where antimalaria measures are conducted and a peripheral or unprotected zone. Monthly visits are made in each zone for spleen and blood examinations. Anopheles breeding-places are inspected weekly, and anopheles larvae and adults are caught and identified regularly at selected catching stations. Dissections are routinely made to determine the malaria vectors. At the Nagenhalli and Mudgere stations enlarged spleens were found in 92 per cent of a group of 640 persons of all ages. The parasite rate of this group was 25 per cent.

An anopheles survey of the city of Bangalore was made in 1928 for the purpose of training malaria personnel in the identification of anophelines. Thirteen species were identified, of which three—*A. culicifacies*, *A. stevensi*, and *A. listoni*—have been implicated as malaria carriers in various parts of India and are probable vectors in this city.

Palestine

Cooperative Aid Concluded.—During the period from May 1922 to the close of 1928, the Founda-



Photograph Excised Here

Major drainage by the use of dynamite in Palestine.

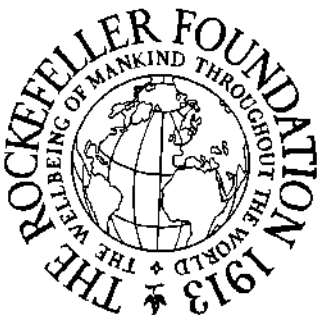
A finished ditch about fifteen minutes after the blasting.

Photograph Excised Here

Spleen examinations of school children were an important feature of the malaria survey made in April 1928 at Kolarovo, one of the seven villages forming the study area of the Station for Field Investigations in Malaria, at Petritch, Bulgaria, towards the operation of which the Foundation is contributing. The spleen index for the children of this group was 85 per cent.

tion cooperated with the Government of Palestine in antimalaria work by lending the services of members of its field staff to the Department of Health. Limited financial aid was also provided. The Foundation's representatives participated in malaria surveys, prepared drainage schemes for certain areas, made recommendations for improving conditions in public lands being opened for settlement, and assisted in carrying out various malaria projects. Efforts were also directed towards transferring the responsibility for antimalaria operations from the central health service to the district health organizations.

It is known that the malaria problem in Palestine has two distinct aspects, urban and rural. The chief vector of urban malaria is *A. bifurcatus*, which breeds throughout the year in wells, cisterns, and other domestic water-containers and has been largely controlled by oiling. Rural anophelines are numerous; the important ones are *A. sergenti*, which breeds during the period from July to December, *A. superpictus*, breeding from April to September, and *A. elutus*, breeding from March to November. Swamps, irrigation canals, seepage areas, pools, and streams constitute the breeding-places of these species. Drainage is considered the most hopeful method of preventing rural malaria. The malaria problem in Northern Palestine includes



Photograph Excised Here

The pasture lands which formerly surrounded the city of Maracay, Venezuela, and provided extensive anopheles breeding-places, are being transformed into truck farms by the cultivation of a zone two kilometers in width about the city. The elimination of the breeding-areas has brought about a marked reduction in malaria.

A novel method of applying larvicide to a shallow morass in Corsica.

Photograph Excised Here

Members of the staff of the anti-malaria station in Corsica digging a pit for the conservation of gambusia during the dry season. Many of the swamps dry up at that time and must be restocked when the rains set in again.

Photograph Excised Here

In the lagoons or estuaries which abound on the east and west coasts of Corsica anopheles mosquitoes breed abundantly. To prevent this breeding the malaria campaign staff is stocking these bodies of water with gambusia where filling is impracticable.

Photograph Excised Here

both rural and town breeding, while in the southern part of the country away from the sea, town breeding is of primary importance. Instruction in the proper use of Paris green as a larvicide was given to sanitary inspectors of the Department of Health. Long distance flights of anophelines from uncontrolled areas, chiefly swamps, into districts where antilarval operations have been established have been found to be a handicap in some areas.

A fellowship in sanitary engineering was granted by the Foundation to a native of Palestine who, after a period of special study in the United States, returned during the past year to the post of engineer in the malaria survey section of the Department of Health. It is expected that he will assume some of the functions of the Foundation's engineer who withdrew from Palestine at the end of the year. From 1918 to 1928 there has been a marked downward trend of malaria in Palestine, as shown by a decline in the malaria deaths and the percentage of palpable spleens. In some places—for example, in Jerusalem—the decrease can be justifiably attributed to antilarval measures; in the country as a whole, however, there are not sufficient data available to deduce with certainty what part of the malaria reduction has been accomplished by such efforts.

The Philippine Islands

Progress in Study and Reduction of Malaria.—The antimalaria program in the Philippine Islands is conducted by the malaria control section of the insular health service, which is supported by the island government. During 1928, field investigations were carried on with the aid of the Foundation, whose representative supervised these studies and also served as consultant to the malaria control section and as a member of the teaching staff of the School of Sanitation and Public Health in Manila.

Of the five field units organized by the malaria control section, three continued operations in the island of Luzón, the island of Mindoro, and the Novaliches area of Luzón. Of the remaining units, one began work in the district of Misamis, island of Mindanao, and the other in the province of Nueva Vizcaya. Larvicidal measures, particularly the use of Paris green, were featured in all these areas. The Novaliches area remained the malaria training base for government personnel.

The importance attached by the government to modern antimalaria procedures is reflected in a recent decision requiring at least fifteen days' laboratory and field instruction in these procedures for a physician subsequent to his appointment as director of a sanitary division in the insular health service.

In three demonstration areas in Pampanga province where antimalaria campaigns have been in progress since 1924, blood indices determined in 1928 showed gratifying reductions over those found four years earlier. In the municipalities of Florida Blanca and Porac a 93 per cent reduction in the amount of malaria had taken place; in the hacienda of Pabanlag, a 72 per cent decrease had occurred.

Observations on the preferential breeding habits of anophelines were continued, and new field studies were undertaken, including, (1) a survey of the malaria situation at Canlubang, province of Laguna, where hospital records showed a remarkable reduction in the number of malaria admissions, due apparently to natural causes; (2) an investigation of the effect of sunshine on breeding-places of *A. minimus* at Pabanlag; (3) an experiment in Laguna province to test the possibility of reducing the cost of antimalaria work by suspending operations during the rainy season; (4) chemical analyses of the water in breeding-places of *A. minimus;* (5) experiments with lime as a diluent for Paris green; and (6) observations on the natural resting-places of adult anophelines during the day.

The Foundation has provided the services of an entomologist who will remain several months

in the Philippines during the coming year to clarify and complete the classification of the anophelines of the islands and to instruct a local entomologist.

V

Hookworm Research and Field Work

During 1928 the Foundation continued to aid the investigation of special hookworm problems by appropriations to the Alabama Research Laboratory and to workers at the Medical School of Vanderbilt University and the School of Hygiene and Public Health of the Johns Hopkins University. These studies have added to our knowledge of treatment and of the host-parasite relationship. Certain general and specific information concerning intestinal parasites has been accumulated.

Alabama Research Laboratory

Septic Privy Effluents.—Studies on the presence and viability of hookworm ova in the effluents of septic privies have indicated that viable ova may be discharged in the effluent, but the possibility that larvae will hatch from such ova in the subsurface drainage area and be able to infest the members of the families concerned seems to be slight. But septic privies used by great numbers, as those at schools, may, under certain con-

ditions, be a public health problem. Tests are in progress to determine the length of time the ova remain viable in septic privies.

The Bored-Hole Latrine.—Arrangements were completed by Dr. and Mrs. F. C. Caldwell to inaugurate studies of the bored-hole latrine. This type of latrine has been used under certain conditions in the East, but little is known regarding its suitability for general use.

Ascaris.—Repeated findings have indicated a very low infestation with ascaris among humans in Alabama, ranging from 3 per cent in the northern counties to 0.2 per cent on the lower coastal plain. In southern Alabama, however, the infestation of pigs approaches 50 per cent. In an effort to explain this difference the Caldwells have added the following to their previous observations: Pig ascaris develop more rapidly than the species infesting humans, (1) under lower temperatures, (2) under higher temperatures, (3) under normal summer temperatures.

Observations at the Johns Hopkins University

The Host-Parasite Relationship.—At the Johns Hopkins University School of Hygiene and Public Health, Dr. W. W. Cort and his associates continued their work on the relation of the dog hookworm (*Ancylostoma caninum*) and its host, giving especial attention to the reactions of the

host to infection. The preliminary results indicate that there is an age resistance to skin infection in dogs: the adults exhibit a marked cutaneous reaction to skin penetration by the larvae, while the puppies do not. In the adults the larvae are retained in the skin for a long time and few migrate to the intestine. In the puppies few larvae linger in the skin, and migration to the intestine is accomplished rapidly. In adult dogs skin infection is followed by a sharp drop in the per cent of eosinophil cells in the blood, which gradually changes to a hypereosinophilia. The percentage of eosinophil cells in the blood does not appear to be closely related to the number of worms present; it is slightly increased after skin infection, but not after mouth infection. In puppies the skin infection is followed by an anemia, which begins about the ninth day and ends in death on the tenth to fifteenth day in severe cases.

It was found that hookworms are rapidly lost from experimentally infected dogs. The greatest number are expelled in the first six months; the remainder are lost very slowly and some persist over a year and a half. Adult dogs lose their worms more rapidly than puppies.

Egg Counts.—In evaluating hookworm egg counts it is important to know what effect the number of worms in the intestine has upon the

number of eggs laid per female worm. Experiments with dogs show a marked difference in the per gram and per day egg production per female worm in infestations of different magnitudes, with the highest outputs of eggs per female worm occurring in dogs harboring small numbers of worms, and the lowest outputs in heavy infestations. This finding reduces considerably the accuracy of estimating worm burdens from egg counts.

Environmental Factors.—The preliminary studies of the environmental factors which influence the free-living stage of the hookworm have resulted in the development of a suitable method of obtaining large numbers of hookworm eggs entirely free from bacteria and feces. Experiments have been performed to show that the direct effects of temperature, moisture, acidity, oxygen, and osmotic pressure upon the development and hatching of these eggs may be measured.

For a long time the general opinion has existed that the normal food of the ancylostoma larvae consists of the finest solid constituents of the feces and, perhaps, of certain substances in solution. Work in Dr. Cort's laboratory, however, has definitely demonstrated that larvae may grow to the infective stage in the normal period of about seven days on pure cultures of

Bacillus coli, B. subtilis, B. prodigiosus, B. lactis aerogenes, Staphylococcus aureus, Spirillum metchnikovii, S. rubrum, and *Micrococcus citreus.*

Panama Studies.—The report of the group under Cort that visited Panama during the summer of 1926 has now been published as a supplement of the *American Journal of Hygiene* (Monographic Series, No. 9). The chief factors which produce the extraordinarily heavy hookworm infestation of Panama are apparently the long rainy season, the intense soil pollution near the habitations, and the custom, almost universal among the people, of going without shoes in their ordinary daily occupations.

The information relative to ascaris and trichuris indicated that children have a much heavier infestation than adults and that young adult females are more heavily infested than males. Differences in rainfall did not produce significant differences in infestation; and treatment and sanitation, as developed in the control work against hookworm, do not appear to have limited the dissemination of ascaris and trichuris.

Further Investigation of Anthelmintics at Vanderbilt University

Carbon Tetrachloride.—Dr. P. D. Lamson and his associates continued their studies of the toxicology of carbon tetrachloride. It has been

previously reported that animals with a negative calcium balance are very susceptible to carbon tetrachloride. Further work by these investigators indicates that this intoxication is due to a lack of calcium and a lowering of blood sugar from an increase of biliary constituents and guanidine in the blood, secondary to an injury of the liver. In the presence of calcium deficiency the taking of meat after carbon tetrachloride has been found to increase the blood guanidine greatly and to cause severe intoxication, though it has no effect on the normal animal. Alcohol causes a tremendous increase of all toxic conditions. Theoretically, it seems that carbon tetrachloride intoxication can be prevented by assuring a proper calcium balance, by the avoidance of meat, fat, or alcohol after administration, or by substituting another drug in the case of alcoholic patients; however, any of these patients may develop a temporary but extensive necrosis.

Tetrachlorethylene.—In their studies of tetrachlorethylene, Lamson and his colleagues found the drug to be non-toxic to dogs in therapeutic doses and only slightly toxic in large doses. No appreciable pathological changes could be found after oral administration. This was considered to be due to the fact that the drug was not absorbed from the intestinal tract, a fact which

they demonstrated. Even after prolonged inhalations no pathological changes could be detected. The drug produces no increase in the guanidine content of the blood, nor does it cause a lowering of the blood sugar.

As tetrachlorethylene is absorbed little, if at all, and is non-toxic if absorbed, it would seem unnecessary to give a large dose of a cathartic after its administration, with the object of removing the drug as rapidly as possible from the intestinal tract. It is suggested that this be kept in mind when using the drug, as a severe purge would seem to have played a large part in several deaths occurring after the administration of anthelmintics. It is further suggested that sodium sulphate be used in the place of magnesium sulphate. This is equally efficient and as easy to take; and it is non-toxic if absorbed, while magnesium sulphate is toxic and neutralizes calcium.

Progress of Antihookworm Work in Mexico

Cooperative Program Concluded.—The five-year cooperative program against hookworm disease undertaken by the Government of Mexico and the Foundation was concluded on December 31, 1928. Throughout the last year of the agreement the government assumed the entire financial support of the work. The Foundation's rep-

resentative continued to supervise the anti-hookworm operations, which were carried on by three field dispensaries in nine communities in three states, namely, Vera Cruz, Chiapas, and Oaxaca. A total of 32,557 persons received 78,420 treatments, and 2,768 latrines of the pit type were installed. The departments of health of Vera Cruz and Chiapas continued to provide the services of sanitary personnel who worked with the units in extending rural sanitation.

Re-treatment.—A study of reinfestation in the Alvarado area, state of Vera Cruz, was completed during the year. Re-treatment work was begun in this area in 1927 and the practise of administering treatments was modified in order that each person might be examined before receiving the anthelmintic, which was given at the headquarters of the unit under the immediate supervision of the medical director. Treatments were repeated at intervals with the object of reducing to a harmless level the number of worms harbored by the patient. The popular reaction has been favorable to this practise of examination before treatment and special attention to the needs of the individual patient, which has been possible in view of the smaller groups requiring the re-treatment.

Expansion of Health Work.—During 1928 one objective of the hookworm campaign was

achieved, namely, the development of permanent local health work to be supported as far as possible from local funds. A county health unit, the first permanent rural health organization in Mexico, was established in a joint health district comprising the municipalities of Minatitlan and Puerto Mexico. The activities of this unit are described in the section of this report devoted to rural health work.

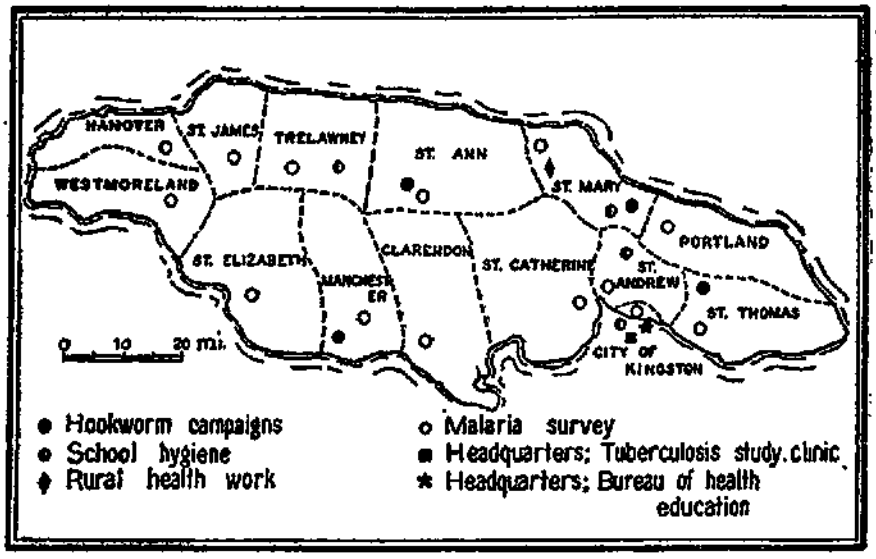
Services in the West Indies Maintain High Standards

Jamaica

Antihookworm Work Firmly Established.—The year 1928 marked the close of a decade of cooperative public health work carried on by the Government of Jamaica and the Foundation, the latter providing both financial aid and trained personnel during this period. Beginning with the campaigns against hookworm disease in 1919, cooperative projects have been extended to other fields of public health work with a view to educating the people in the essentials of disease prevention and also assisting the government to organize and develop an enlarged and permanent health program within the financial resources of the colony.

By the close of 1928, sanitation and hookworm treatment campaigns had been conducted in

eight of the fourteen parishes in the colony. Of the remaining parishes all but two have arranged for latrine construction in demonstration areas within the parishes, which will be properly



Extent of cooperative public health work in the fourteen parishes of Jamaica in 1928.

sanitated before treatment is begun. The anti-hookworm program was continued during 1928 by two treatment units and one sanitation unit, which operated in four parishes. Since it has proved impossible for the single sanitation unit to meet the requests of various parishes for presanitation, the Legislative Council has made provision for a second unit which will begin its work early in 1929.

Sanitation is entirely the responsibility of the central and local boards of health. Adequate sanitation of the home has been constantly emphasized throughout the campaigns; popular

response in building and maintaining permanent latrines has been gratifying. During the past year the sanitation unit worked in the parishes of St. Ann and St. Thomas and secured the construction of almost 5,700 approved latrines which will afford sanitary protection to more than 27,000 persons. The Board of Health of Manchester parish carried on sanitation in several areas selected for demonstration hookworm treatment campaigns in the coming year. The permanent departments of sanitation in parishes which have already benefited by hookworm campaigns continued to maintain their sanitated areas and to extend latrine installation to other districts.

The Foundation continued to aid one of the two treatment units, providing 50 per cent of the budget during the first four months of 1928 but only 25 per cent for the remaining eight months of the year. These units continued curative measures in the parishes of St. Ann and St. Catherine and began a treatment campaign in the parish of Manchester. A total of 33,978 treatments was administered to 13,847 persons. One hundred public lectures were attended by approximately 20,000 persons in the three parishes.

During the past year a large proportion of the island population was reached by means of the cooperative health activities which included, besides the sanitation and hookworm treatment

campaigns, intensive health education, school hygiene, rural health work, and malaria and tuberculosis surveys, all of which are discussed in various sections of this report.

Porto Rico

Hurricane Interrupts Hookworm Program.—On January 1, 1928, the Government of Porto Rico assumed the entire administrative and financial responsibility of the island-wide antihookworm program carried on by the bureau of rural sanitation of the insular Department of Health. The Foundation's representative in Porto Rico, however, continued as adviser to the government on rural health and sanitation activities.

Up to the time of the hurricane on September 13, 1928, the government hookworm program made satisfactory progress. During the first seven months of 1928 approximately 4,800 new latrines were erected, more than 3,300 old latrines were repaired or entirely rebuilt, and 51,869 hookworm treatments were administered. The hurricane destroyed thousands of poorly constructed houses, but a large percentage of the latrines at these homes were only slightly damaged, an excellent commentary on the permanence of the well-built type of latrine installed in so many localities in Porto Rico as a result of antihookworm campaigns. Popular apprecia-

Photograph Excised Here

Ruins of a Porto Rican home which was demolished by the hurricane of September 1928, while the latrine remained unharmed. The hurricane destroyed thousands of rural homes, but in general the well-built latrines suffered little damage.

Photograph Excised Here

Sanitary latrines are replacing makeshift contrivances of this type in areas throughout the tropics where hookworm campaigns are being conducted.

Since the inauguration of anti-hookworm measures in Venezuela sanitary pit latrines of adobe brick, which is cheap and easily obtainable, are being installed in large numbers.

tion of the primary importance of sanitation was amply illustrated in reconstruction work in the hurricane area, for the home often remained a makeshift abode until the latrine had been satisfactorily repaired. After the hurricane the majority of the government sanitary inspectors engaged in rehabilitation activities; the remaining sanitary personnel were assigned to reinspection work and to promoting the repair of damaged latrines. The bureau of sanitation was unable to resume its normal functions before January 1, 1929.

Field Studies on Reinfestation.—A question of outstanding importance in any hookworm program is what amount of reinfestation occurs in areas previously covered by campaigns against the disease. In order to measure the degree of infestation now existing in areas where treatment had been carried out by the cooperative hookworm units during the period 1921–27, the Foundation supplied funds for a resurvey of these regions under the direction of its representative. Headquarters for the resurvey were provided at San Juan by the insular Department of Health, and a laboratory was established.

The factors measured in each area studied were: the degree of infestation, as indicated by the Stoll egg-count method; sanitation, through the inspection of existing latrines, which were classified by an arbitrary system based on the

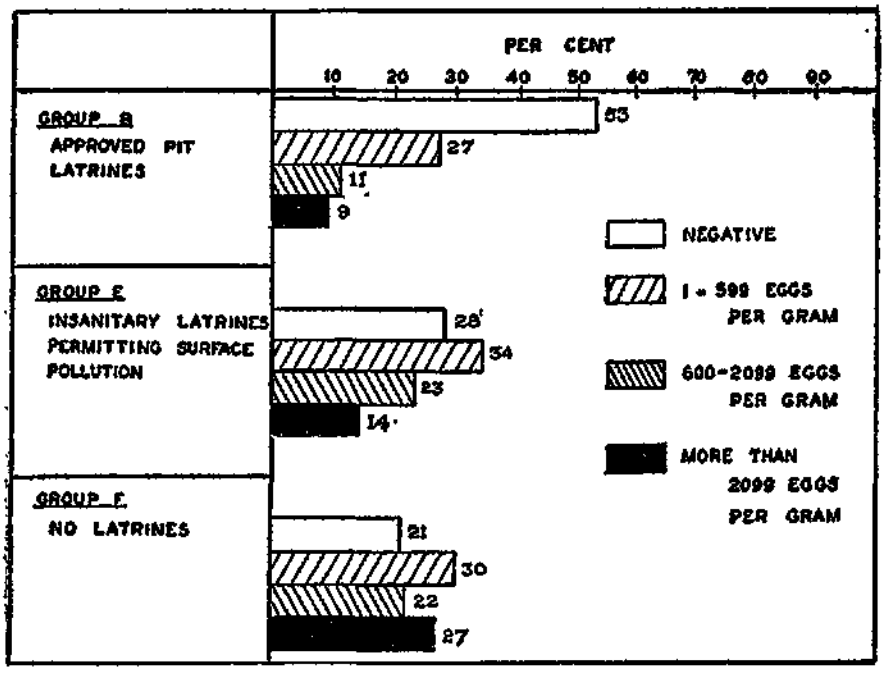
Photograph Excised Here

Member of the staff of the division of health education, Java, giving a home talk on hookworm disease and rural sanitation.

Photograph Excised Here

Group awaiting treatment at the hookworm dispensary established in the department of Copan, Honduras, in 1928.

prevailing types in the areas under investigation; hemoglobin, which was generally determined by the Tallqvist scale. Different types of areas were



Relative degrees of hookworm infestation in Porto Rican groups classified according to type of latrine in use at the time of resurvey in 1928 of areas where hookworm campaigns had been conducted between 1921 and 1927.

resurveyed, including selected communities in seven municipalities in northern Porto Rico, namely, Arecibo, Bayamon, Camuy, Hatillo, Isabela, Manati, and Quebradillas. In some areas the degree of infestation had previously been determined and thus opportunity was afforded for comparison with the present intensities of infestation. A special group of districts was chosen, some of which had not been previously sanitated, and conditions in the latter can

be contrasted with those in the areas in which sanitation programs have been effective for a number of years.

The resurvey program was unfinished at the end of the year, but according to the preliminary findings secured in areas where sanitation and treatment campaigns had been completed three or more years prior to the resurvey, there is no apparent relation between the length of time since treatment was concluded and the degree of infestation. The most striking correlation which is shown is that existing between the type of latrine in use at the time of the resurvey and the degree of infestation of the persons examined. Observations have disclosed that as the type of latrine improves there occurs a diminution in the average hookworm egg count, an increase in the number of negative specimens, and a marked decrease in the clinical manifestations of the disease. It is probable that if a desirable standard of latrine construction had been maintained in all cases, the influence of sanitation on reinfestation would be found to be even more favorable than the preliminary results have revealed.

Treatment a Major Activity, But Sanitation Receiving Increased Emphasis in Central America

In Central America during the past year the Foundation contributed funds towards antihook-

worm programs in only two countries, Guatemala and Panama. Representatives of the Foundation, however, continued to supervise the hookworm work carried on by the governments of Costa Rica, Honduras, Nicaragua, and Salvador.

Costa Rica

Government Work Goes Forward.—The efforts of the Government of Costa Rica to develop a modern health organization within the financial resources of the republic have progressed despite many difficulties. In 1928 such essential health services as sanitary engineering and vital statistics began to function under the direction of Costa Ricans who had received special training in these fields through Foundation fellowships. The first country-wide census undertaken in thirty-six years was completed and the first county health organization was established in the province of San José. The services of a representative of the Foundation continued to be available to the Ministry of Health as consultant on national health problems and as supervisor of the government hookworm program.

Antihookworm operations were continued in those areas which, according to egg-count determinations, warranted such measures. Latrine construction showed considerable improvement over the previous year both in volume of work

and type of convenience installed. The creation of a permanent national service of trained sanitary inspectors by official decree of July 5, 1928, may be expected to result in more rapid progress in rural sanitation.

Guatemala

Government Finances Hookworm Work.—Since July 1, 1928, the Government of Guatemala has entirely supported the antihookworm program, in accordance with the five-year cooperative agreement with the Foundation which became effective July 1, 1924. The Foundation continued to provide the services of its representative as director of the work.

During the year the egg-count survey, which has been conducted in twenty-three representative districts in the republic, was completed. An analysis of the findings of this investigation will furnish valuable data on the hookworm problem in Guatemala, particularly in defining the areas in which antihookworm measures should be carried out. The treatment campaign has been simplified by employing modified mass treatment procedures based entirely on egg-count surveys in typical districts in the areas covered. Field dispensaries were active in thirteen departments of the republic, and 29,700 persons were treated. A beginning has been

made in the construction and more general use of latrines.

That the results of the hookworm campaign have been fruitful in stimulating the government to greater activity in public health work is shown by the fact that, during 1928, authorization was given for the reorganization of the existing national health service into a broader and more effective national Health Department. For the fiscal year beginning July 1, 1928, the government voted $165,000 for public health work in the republic, as compared with $50,000 during previous years.

Honduras

Reorganization of Campaign.—In Honduras the work of the former division of uncinariasis has been incorporated in the newly created department of tropical diseases which, under the direction of a former Foundation fellow, will carry on a combined program against hookworm disease and malaria. Under his administration the hookworm campaign has been reorganized.

The hookworm intensity survey begun in 1927 made favorable progress. In the northern and northwestern sections of the republic sufficient data have been secured to make possible effective antihookworm operations in an extensive and populous area where work has not

hitherto been conducted. During the year hookworm field dispensaries were operated in small towns and rural areas in twelve departments situated in the central, western, and northwestern parts of the country. To secure adequately trained technicians for hookworm and malaria work, practical training was provided for field personnel at San Pedro, department of Cortés, and at the central office in the capital city of Tegucigalpa.

In the reorganization of public health activities in Honduras the importance of promoting permanent health programs has been stressed. Two major health districts have been established; one includes five departments in the northern and western parts of the republic with the town of San Pedro as a center, while the other comprises several departments in Southern Honduras with headquarters at Choluteca.

Nicaragua

Country-wide Program Under Way.—Improved political conditions in Nicaragua in 1928 permitted the national Health Department to carry on work in practically every department of the republic for the first time since its organization in 1925. An important step forward was the extension of its program to the eastern part of the country with a view to building up permanent

local health organizations in this extensive area. Headquarters for the department of Bluefields were established in the town of Bluefields. At this point a hookworm dispensary and a branch public health laboratory were opened, and a campaign of rural sanitation was initiated. A bureau of health education was also organized in the national health service under the direction of a former Foundation fellow. The monthly bulletin of this bureau has been widely circulated in the republic and sent to all Latin-American countries.

The hookworm service, which operates through the division of rural hygiene and local health organization, was able to function normally for the first time in two years. Field dispensaries were active in every department in the country during the course of the year, and the volume of work accomplished showed a considerable increase over 1927. A total of 46,215 treatments was administered to 27,071 persons. Greater emphasis was placed on latrine construction.

Panama

Permanent Sanitary Service Extended.—During the year the former department of uncinariasis of the national Health Department was designated the division of communicable diseases and

epidemiology. Its program, however, was restricted to antihookworm work. The division was active along established lines of presanitation, treatment, the maintenance of latrines, and health education. Financial aid towards the government hookworm budget was continued.

Unsettled political conditions, due to a change of government in the fall of the year, retarded somewhat the progress of operations. Nevertheless, 34,091 hookworm treatments were administered to 12,368 persons by the permanent hookworm dispensary in Panama city and by the field dispensaries which completed sanitary and treatment campaigns in five municipal districts in the province of Chiriqui comprising more than one hundred towns and villages, and were still at work in two other districts in the same province at the end of the year.

Latrine construction was continued by the field units and by provincial sanitary inspectors in areas where treatment campaigns had been completed. More than 1,800 new latrines were installed, and 2,172 insanitary conveniences were repaired. With the addition of the province of Chiriqui, six of the nine provinces of the republic are now included in the permanent sanitary service whose staff of six provincial sanitary inspectors was increased during 1928 by five assistants. The municipality of David sup-

ported two sanitary inspectors, who were supervised by the hookworm field director; the municipality of Alanje employed one inspector for part of the year.

Salvador

Advisory Service Provided.—On occasional visits to Salvador during the year, a Foundation representative continued to assist the national Health Department in developing its hookworm program, chiefly by training personnel in the technic of egg-counting, selecting areas for the proposed intensity survey of the republic, and promoting mass treatment.

Hookworm Activities in South America

Colombia

Work in Nine Departments.—In Colombia the Foundation continued to participate in a cooperative program against hookworm disease, in accordance with a five-year agreement which commenced January 1, 1926. During 1928 the government contributed 70 per cent of the cost of the work which was directed by the Foundation's representative. Antihookworm activities functioned in nine departments of the republic, eight of which voted funds towards the support of the work. Because of transportation difficulties operations were temporarily discontinued in the

departments of Atlantico and Magdalena and efforts were concentrated on the departments located in the Cáuca valley, namely, Antioquia, Caldas, Cáuca, and Valle, which represent the more progressive regions of the country. The department of Cáuca was entered for the first time; it is expected that a demonstration of the more intensive methods in the prevention of hookworm disease and also a training station for new employees will be developed in this area.

Latrine construction has shown improvement, particularly in the Cáuca valley, where latrines of a more substantial type are being erected. Inspection has shown that these conveniences are being used. The regular sanitary personnel of the campaign reported that 5,582 new latrines were built and 1,219 old ones were made sanitary during 1928; more than 29,000 homes were visited by the sanitary inspectors. One of the most encouraging developments of the campaign has been the appointment of municipal sanitary inspectors supported by local funds. This is the first step in the development of a permanent service of latrine supervision and maintenance.

Fewer treatments were administered in 1928 than in previous years, since almost all accessible groups of the population had already received medication and the majority of the units worked in areas where treatment campaigns had been

carried out previously. The treatments given during the year totaled 201,046. In the larger towns severe cases of hookworm disease, formerly so common, are seldom seen.

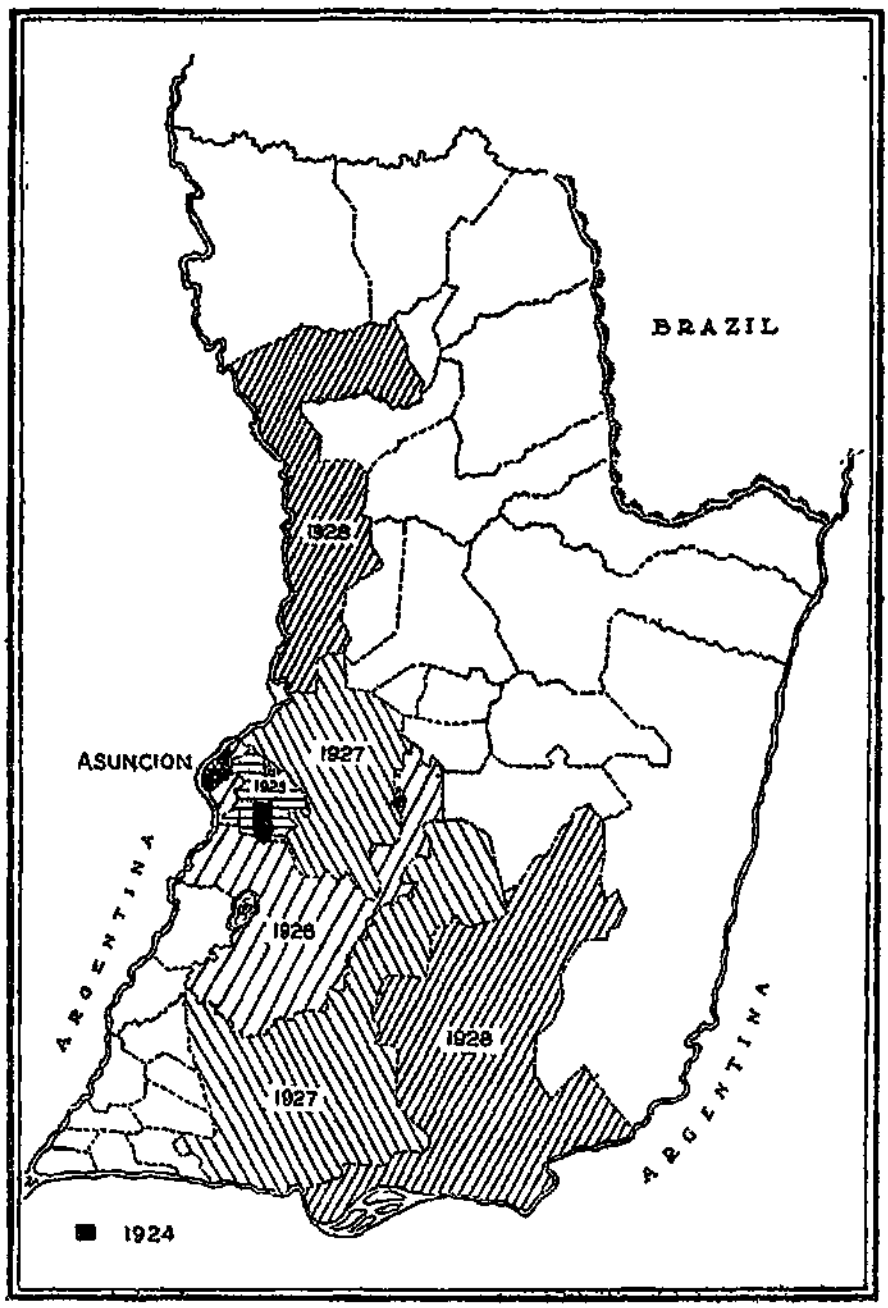
For the antihookworm campaign in 1929, the national government voted funds amounting to $100,000, an increase of $20,000 over the sum appropriated for 1928.

Paraguay

Five-Year Program Concluded.—The campaign against hookworm disease which has been conducted by the Government of Paraguay with the aid of the Foundation over a five-year period has been concluded. Because of disturbed political conditions the hookworm service was discontinued at the end of 1928. During the year a dispensary was maintained at Asunción and hookworm posts carried on sanitation and treatment in twenty-three towns. Including the medication dispensed at the rural health post in Itá, 142,956 hookworm treatments were administered to 80,979 persons. An inspector was detailed to treat all soldiers at the Asunción garrison, a heavily infested age-group, and to give instruction in the technic of hookworm treatment to students in the army school of nursing.

The sanitary campaign of 1928 was not considered to be as successful as the campaigns of

former years; nevertheless 19,755 latrines were installed. In the twenty-three areas where work



Areas of Paraguay in which antihookworm work was conducted during the period 1924–1928. Within these areas is found 77 per cent of the estimated population of the country; 51 per cent of the residents of the areas received treatment.

was conducted, only 8 per cent of the 28,000 homes visited had latrines when first inspected, but the final inspection of the year showed 77 per cent equipped with such conveniences.

During the year a resurvey of hookworm incidence and sanitary conditions was made in a section of Recoleta, a mixed urban and rural suburb of Asunción having a population of approximately 4,000. Of 1,581 persons examined according to the Willis method, 86 per cent were found positive. The incidence among this group according to age showed the usual distribution for Paraguay, with the lowest incidence in the age-group 0–5 years; egg counts disclosed the highest intensity in the age-group 11–15 years. Only 36 per cent of the homes were found to have latrines at the time of the resurvey, of which the majority were in the urban area. Since practically every home in Recoleta was sanitated during the campaign of 1925 the need for a permanent sanitary service in the republic was again emphasized.

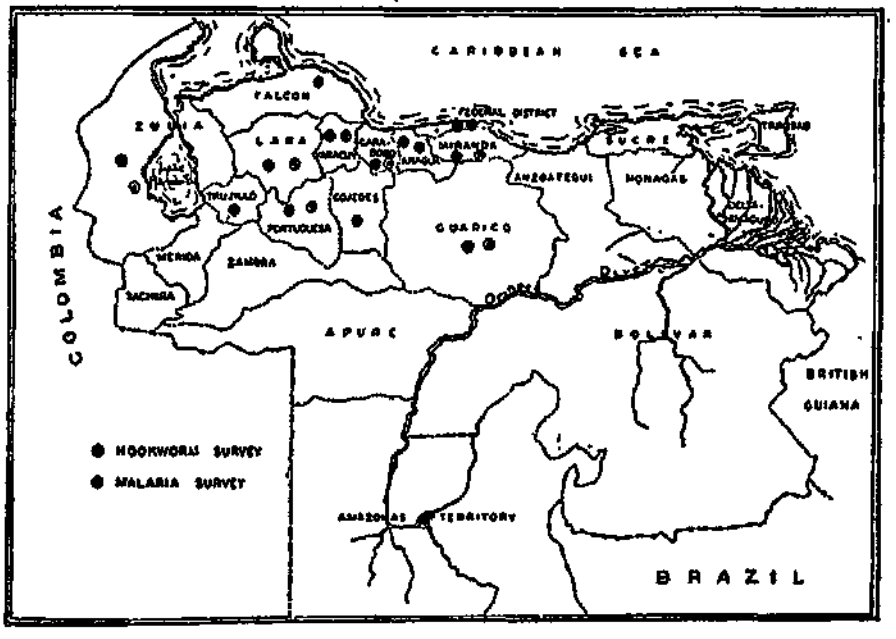
A review of the results accomplished by the campaign during the past five years shows that all the more heavily populated areas in the country were reached, with the exception of a small zone in the extreme southwest. Over 646,000 persons were included in the census, representing approximately 77 per cent of the esti-

mated population. A total of 738,762 hookworm treatments was given to 424,128 persons. Every effort was made to promote the construction of a permanent type of latrine and to secure its use and maintenance. While many of the 90,000 latrines which were built possessed only a temporary value from a sanitary standpoint, their installation represented an important step forward in educating the people in the value of disease prevention. Popular health education was emphasized, and 1,833 public and school lectures were attended by 300,000 persons. The personnel of the campaign vaccinated 31,000 persons against smallpox during the five-year period.

Venezuela

A Hookworm Program Undertaken.—The survey of hookworm infestation in Venezuela, initiated in February 1927, was completed March 31, 1928. Hookworm prevalence and intensity were studied in thirty-eight communities in twelve states. Commencing in the Maracay district and the Lake Valencia region, the survey extended westward as far as Lake Maracaibo, south to La Rubiera and the Orinoco river, and east to Rio Chico. The only important areas which were not included were the distant region of the Andes bordering on Colombia and the eastern portion of the country.

Up to the time of the survey, hookworm disease had not been considered a public health problem of primary importance in Venezuela. In the areas studied, more than 10,000 specimens



Areas of Venezuela in which surveys of hookworm disease and malaria were made, 1927–1928.

were examined; of these, 70 per cent were found positive. Only 917 persons, or 8 per cent of those examined, were found to be free of intestinal parasites. The hookworm infestation rate reached as high as 90 per cent in the plains; in the Yaracuy valley and Lake Valencia basin a similar high infestation prevailed, with many cases manifesting severe symptoms of the disease. Certain areas in Lake Maracaibo district and the coffee plantations of Miranda also showed a heavy infestation. A milder type of hookworm disease was found in the northern

coastal regions, the environs of Caracas, the city of Maracaibo, and in mountain areas.

From the findings of the survey it was concluded that inadequate sanitation is largely responsible for the general prevalence and severity of hookworm disease but that occupation, the amount of rainfall, and temperature conditions are important contributory factors. Outside the largest cities and towns not more than 10 per cent of all homes are provided with latrines. It was recommended that intensive operations be carried on in the states of Aragua, Carabobo, and Miranda, which offer accessible populations with heavy infestations. A definite antihookworm program was formally approved by the government in July 1928, although sanitation and treatment work had already been carried on during and subsequent to the survey, at government expense but directed by the Foundation's representative. The cooperative antihookworm program is supervised by the director of the national Department of Health and functions through a special division, the service of ancylostomiasis. The Foundation provides only the services of its representative in Venezuela, which will be available until local personnel have been trained to take charge of the work.

The program consists of four phases: first, presanitation, after which the second phase,

conservation or maintenance, is assured by leaving in each district where work is completed by the sanitary campaign staff, a trained sanitary inspector who will supervise latrine installation and maintenance and promote the proper use of these conveniences; third, treatment measures, which follow immediately upon sanitation of the area; fourth, popular health education in general hygiene and dangers of soil pollution, which is carried on from the outset of the campaign. The sanitary unit, which consisted of a chief inspector and five assistants, all on a full-time basis, commenced organized sanitation in the city of Maracay in October 1928. At the beginning of the survey in 1927, less than 40 per cent of the houses in this city were equipped with latrines, but the new census in October showed that more than 50 per cent of the homes had these conveniences, of which 30 per cent were acceptable. Of the remaining houses with unsatisfactory accommodations, 30 per cent had either built new latrines or repaired old ones by the close of the year. Presanitation measures and the subsequent administration of treatments showed satisfactory progress by the end of 1928.

European Hookworm Program Is Limited to Spain

In Spain the Foundation continued aid to the program begun in 1926 for eradicating hook-

worm disease in mines, and also assisted a project which was initiated during 1928 in the municipality of Murcia to reduce and prevent surface hookworm infestation in that area. The antihookworm work carried on in Spain has proved an excellent medium for arousing popular interest in public health, with particular reference to the importance and need of sanitation.

Work in Mines.—Because of unfavorable economic conditions many mining cómpanies experienced difficulty in meeting the government antihookworm regulations and sought a government subsidy to relieve this situation. The government provided funds which were administered through the national Department of Health and given chiefly to those mines which were found to be inadequately sanitated. Operations against hookworm disease in mines were carried on in the provinces of Ciudad Real, Cordoba, Jaen, and Sevilla. Commendable progress has been made, particularly in the district of Linares in the province of Jaen, where hookworm disease has ceased to be an economic factor. In that district the infestation rate has dropped from 28 per cent among 4,000 miners examined in 1925 to less than one per cent among 3,000 miners examined in 1928. Every mine in this area has been properly sanitated and is carefully supervised to prevent reinfestation. One of the largest

mining interests in Spain, which operates coal and lead mines in several provinces, recently organized a service to combat both hookworm disease and malaria among its labor forces. It has established a hookworm laboratory at Pueblo Nueva Terrible in the Province of Cordoba, which is one of the largest coal mining districts in the country.

During 1928 the government supervisor of the mine hookworm program visited mining communities which had not been previously surveyed. The phosphorus mines in the provinces of Cáceres and Badajoz and mining areas in the provinces of Valencia, León, and Asturias were found to be free of hookworm infestation.

Surface Hookworm Infestation.—It has been known for several years that surface hookworm infestation existed in several Mediterranean subtropical provinces of Spain. Surveys disclosed widespread infestation in the municipality of Murcia, which has a rural population of approximately 100,000. This area comprises a broad plateau where intensive cultivation of rotating crops requires the use of irrigation throughout the year. The Foundation agreed to contribute funds towards a cooperative program of antihookworm work to be conducted by the municipality of Murcia but organized and directed by a representative of the national Department of

Health. A hookworm laboratory was established early in 1928 at De Soto, one of the fifty villages within the municipality; a house-to-house sanitary survey was undertaken together with latrine construction, examination, and treatment.

In this village of 1,313 persons, 24 per cent were found positive; egg counts showed that 85 per cent of the positive cases were carriers, who apparently suffered no ill effects from the disease. Despite these findings the hookworm problem is considered to be of importance in Murcia; latrine facilities were found at only 30 per cent of the homes inspected, and the majority of these were insanitary. A municipal ordinance was promulgated requiring a latrine at each home; more than 100 new pit latrines were installed, insanitary ones were improved, and at the end of the year only 9 per cent of the homes were without sanitary conveniences. Upon completion of sanitation and treatment work in the village of De Soto, the hookworm laboratory will be transferred from village to village until the sanitation and treatment campaign has reached the entire municipality.

Programs in the East Vary with Local Needs

Ceylon

Government Directs Campaign.—On January 1, 1928, the Government of Ceylon took over the

direction of the campaign against hookworm disease which had been supervised up to that time by the Foundation's representative. The Director of the Department of Medical and Sanitary Services placed the administration of the work under the sanitary branch of that service with a view to coordinating sanitation and treatment measures. The representative of the Foundation remained in Ceylon during part of the year, and his services were available for promoting hookworm work and other public health activities.

The permanent hookworm treatment program continued to function along the general lines described in recent annual reports of the Foundation. Seven itinerating treatment units, each in the charge of a medical officer of health, administered periodic mass treatments to school children, village populations, and estate laborers in eight of the nine provinces into which Ceylon is divided. The Indian emigrants at Mandapam Camp in Southern India and practically all patients in public hospitals and dispensaries received medication as in former years. Furthermore, many estates continued to treat their labor forces periodically.

The hookworm campaign staff continued its efforts to stimulate interest in sanitation by instructing the people in the value of latrines and

their general use and upkeep. While many of the schools visited during the year were equipped with sanitary conveniences, the campaign personnel found it necessary to emphasize the importance of the proper use and maintenance of school latrines. Health education remained an important feature of the permanent hookworm program. Illustrated lectures in schools and public places were attended by 345,984 persons.

India

Hookworm Survey Completed in Mysore.—The hookworm survey which was begun in July 1927 in connection with the public health survey of the state of Mysore was completed October 1, 1928. The findings of this survey showed that hookworm infestation is a serious public health problem in a limited area in the state comprising those portions of Mysore, Kadur, Shimoga, and Hassan districts where a heavy rainfall prevails or where a considerable proportion of the population is employed for part of the year on estates in areas of high rainfall. In all, 8,934 persons were examined during 1928, and of these, 53 per cent were found positive. Proposals for organized measures against hookworm disease were submitted to the government, which approved the initiation of such work early in 1929.

Bureau of Sanitation Assumes Direction of Hookworm Program in Madras Presidency.—Since 1920 the Foundation has collaborated with the Government of the Madras Presidency in a campaign against hookworm disease by contributing funds and providing a field representative to direct activities. On January 1, 1928, the government assumed the responsibility for the operation of permanent antihookworm measures under the newly created bureau of rural sanitation in the Department of Public Health. The Foundation will continue financial assistance towards this work for a limited period.

During 1928 the bureau emphasized rural sanitation. Active campaigns against soil pollution were continued in Madura district and on certain estates in Nilgiri district, and were initiated in Chingleput and Malabar districts with the aid of local funds. Popular approval of the bored-hole latrine in Madura district has increased the number of these sanitary conveniences in that area. Up to November 1 a total of 141,000 treatments for hookworm disease had been administered; of these, 72 per cent were given at government hospitals and dispensaries.

The bureau began its educational work on disease prevention by preparing special bulletins on the eradication of soil pollution, which were widely distributed. Articles on this subject

were also prepared for publication in the press. Through the initiative of the bureau the hookworm film was shown to the health officers' class at the Madras Medical College, literature was distributed to these students, demonstrations of methods of treatment were given, and the practical details of a program for the eradication of hookworm disease in a given area were presented.

Netherlands East Indies

Health Education the Avenue of Approach.—The Foundation continued to collaborate with the Government of the Netherlands East Indies in developing a program of rural sanitation and public health education through the division of health education, whose activities are directed by a Foundation representative. The division is establishing a system of education which can be permanently integrated with the government health service and adapted to meet local economic conditions; one of its most important aims is to secure local financial support for rural health work.

In addition to the sanitary campaigns and the educational activities which were conducted by field posts in eight residencies in Java and in the Lampongs district in Sumatra, the division began operations in residency South Celebes, island

of Celebes. Funds for several new field posts have already been voted by the local residency councils but their organization has been delayed owing to lack of medical personnel, which represents the greatest obstacle to the progress of the division's program.

A fire destroyed practically all locally made health films; these, however, are being replaced, and arrangements have been completed by the government to house the central office and the proposed health museum in a more favorable location in the city. In order to meet the increasing demand, an extensive organization has gradually been built up at division headquarters for the preparation and distribution of a wide variety of educational material, which embraces moving picture films, lantern slides, photographs, charts, and posters relating to latrine construction and the prevention of soil pollution and such endemic diseases as hookworm, malaria, trachoma, smallpox, yaws, and plague.

Educational exhibits were prepared and set up at several local fairs in Java, while a special demonstration of methods and equipment employed in health education campaigns was arranged for members of the Volksraad, or legislature, during their recent session. Demonstration automobiles, which now number four, operated in seven residencies in Java; 803 public

lectures and demonstrations were given during the first nine months of 1928. For the benefit of inaccessible rural villages which cannot be reached by the automobiles, a two-wheeled demonstration cart has been equipped to carry a projector and other educational equipment.

Home visits by well-trained division inspectors have proved to be a most constructive method of approach in educating a rural population in the fundamental principles of hygiene and sanitation. Up to October 1, 1928, a total of 141,892 home demonstrations had been given by the division. During the same period 5,033 lectures were held at schools and public places.

One of the most important forward steps in improving rural health conditions is the recent government ruling whereby a government Indian doctor appointed to conduct a rural sanitary campaign must devote his entire time to the work. A comprehensive program of health education in schools has been worked out, and before the close of the year two doctors had been assigned to this special field and were being trained preparatory to commencing activities early in 1929.

Siam

Work Reaches Large Numbers in 1928.—The cooperative program against hookworm disease

in Siam, which has been conducted by the sanitary campaign division of the Department of Public Health since April 1, 1924, is drawing to a close. According to its agreement the government paid 80 per cent of the cost of the work in 1928. The Foundation's representative continued as adviser to the division. The program of the division has been broadened to include, besides hookworm treatment and rural sanitation, the operation of a local health organization at Lopburi and the promotion of public health laboratory work in the interior of the country.

Antihookworm campaigns were highly successful during the year; treatment and rural sanitation operations were completed in thirty-two districts or counties, representing more than twice the number of areas in which work was finished in 1927 and four times the number in which operations were completed in 1926. The population of these counties is over 607,000. The mass treatment method was generally employed, and 346,962 treatments for intestinal parasites were given; the five field units, the health boat, and the local health organization at Lopburi administered about 97 per cent of the total number.

The progress in sanitation was also notable. In the thirty-two counties where work was

completed during the year, the newly installed and repaired latrines totaled 83,085. Quantitative expansion is shown by the fact that this number of latrines is twice as great as the number recorded for 1927 and more than five times that recorded for 1926. At the outset of the campaign in these counties there were practically no sanitary latrines at the homes, but at the end of the campaign satisfactory conveniences had been erected at from 17 to 91 per cent of the houses in the several counties.

In the counties in which the antihookworm units have completed their work, a trained sanitary inspector has been appointed whenever possible to continue and extend the work already accomplished. In 122 counties where operations had been finished by the close of 1928, there were fifty-six county sanitary inspectors working in as many areas, an increase of twelve inspectors over those employed in 1927. During 1928 these inspectors secured the construction or repair of 55,335 latrines, administered 4,850 treatments for intestinal parasites, inspected 53,607 domestic water-supplies, and gave 38,538 smallpox vaccinations. Several municipalities in the interior of Siam also employed sanitary inspectors. Thirty-three candidates for the post of sanitary inspector, most of whom were from the interior, participated in the annual course of seven weeks'

duration arranged for these workers in Bangkok.

The field laboratory unit continued its efforts to develop a public health laboratory service for the interior of the country. This unit also endeavored to determine the intensity of hookworm infestation in each community visited during the year. Since the population in Siam was found to be infested with different species of hookworms, the egg-count method of determining the intensity of infestation was discontinued in favor of the Darling worm count. The investigation was limited to an examination of 1,133 prisoners in certain interior towns, of whom 38 per cent were found positive to hookworm disease. The degree of infestation was light in 87 per cent of these cases. Heavy infestations were not encountered.

The health education section continued its program in Bangkok and other parts of the country. Health exhibits were prepared, and more than 260 illustrated lectures covering a wide variety of health subjects were delivered to audiences aggregating approximately 431,000 persons.

South Pacific Islands

Program Extended to New Areas.—During the past year the Western Pacific Health Service, which is fully described in the rural health section of this report, carried on antihookworm

campaigns with the aid of the Foundation in the British Solomon Islands protectorate and the Gilbert and Ellice Islands colony. Extensive operations were undertaken in three islands of the British Solomon group; a total of 18,119 persons, or 87 per cent of the population, received medication. Work was conducted in the Gilbert and Ellice Islands during part of the year.

In the island of Fiji, where a permanent government program of sanitation and treatment has been in operation since January 1925, and where hookworm disease is no longer an economic problem, a sanitary survey was made and suggestions were offered for the further raising of sanitary standards. In the course of a public health survey in Rotumah, an important island of the Fiji group, more than two thousand persons were treated for hookworm infestation. Periodic mass treatments as well as the installation of fly-proof latrines were recommended to reduce the incidence of hookworm disease.

Straits Settlements

Government Takes Over Hookworm Work.— On December 31, 1928, the three-year cooperative agreement between the Government of the Straits Settlements and the Foundation, for the operation of a rural sanitation campaign, was concluded. This campaign has involved the ad-

ministration of mass hookworm treatments, the development of a permanent system of night-soil disposal throughout the colony, intensive public health education, and the establishment of district health centers. At the beginning of 1929, the department of medical and sanitary services of the government will assume full financial and administrative responsibility for this program.

Treatment.—At the close of 1928 the sanitation campaign had reached all rural areas in the Straits Settlements except several small islands. In the three years 463,522 hookworm treatments were administered; of these, 56,905 were given by the campaign staff, while most of the remainder were administered at the government hospitals and dispensaries and the district health centers, and by private physicians. Upon the completion of the campaign in all areas except Singapore the staff was transferred to government administration, and by this step hookworm mass therapy ceased to be a temporary campaign measure and became a permanent routine health procedure carried on by the district health centers and traveling dispensaries.

From the outset of the campaign in Singapore, where work was begun early in 1928, hookworm treatments have been a routine function of the department of medical and sanitary services. To reduce further the spread of hookworm in-

festation among estates in the colony, the government completed arrangements to administer treatment to incoming Chinese coolies suffering from hookworm disease. For some time all Indian immigrant coolies have been examined and treated at the quarantine station in Penang.

An interesting feature of the campaign in Singapore was a series of examinations to determine the relative infestation among children in municipal and rural schools. Rural schools showed an infestation rate of 68 per cent, with 27 per cent of the pupils classified as heavily infested, while in urban schools 45 per cent of those examined were found positive to hookworm, with 13 percent in the relatively heavily infested groups. These findings suggest that the conservancy system in operation in the municipality of Singapore is responsible for a lower index of incidence and intensity than is found in the adjacent rural areas.

Sanitation.—The latrine surveys conducted in rural areas in Penang, Province Wellesley, and Malacca in preceding years showed that only 30 per cent of the homes had sanitary conveniences, and that of these, only a limited number could be classed as satisfactory. Although progress in latrine construction has been slow, the results are, nevertheless, encouraging: measures for the control of soil pollution are well under way in a

large number of the forty-eight gazetted villages of the colony where no satisfactory system of night-soil disposal existed previously. Field experiments to test the feasibility of the bored-hole latrine in the Straits Settlements have been started in rural areas in Singapore, Penang, and Malacca. Information regarding its advantages, considerations of safety, and practical details of construction has been collected.

Education.—A program of health education has been carried on from the beginning of the campaign; keen interest in the prevention of soil pollution and in other health problems has been aroused through such media as pamphlets, charts, colored posters, models, exhibits, lantern slides, and moving pictures. The importance of visual education in stimulating popular interest in health work among native populations is aptly illustrated in the Straits Settlements where numerous races with a great diversity of customs and habits are found and where the cosmopolitan character of the population necessitates instruction in at least a dozen different languages and dialects.

VI

Aid to State and National Health Services

Through the contribution of funds or the provision of services of field representatives the

Foundation, during 1928, assisted twenty-two state health departments in the United States and the national health departments of twenty foreign countries in developing and maintaining certain essential divisions of their central organizations.

Public Health Laboratory Service

Central America

To extend public health laboratory service in Central America, the Foundation collaborated with the national health departments of four countries. In Guatemala and Nicaragua financial aid was given, and in Costa Rica and Honduras the advisory services of a representative were provided.

Costa Rica.—At the public health laboratory in San José, Costa Rica, more than 35,000 examinations were made during 1928, which is the maximum amount of efficient work possible with present facilities. Approximately 90 per cent of the examinations were of a public health nature.

Guatemala.—In addition to granting funds for the maintenance of a small diagnostic laboratory in Guatemala City, the Foundation contributed a sum to cover the cost of equipment for an enlarged public health laboratory service to be maintained by the Government of Guatemala in the national Health Department. A Guate-

malan physician who is receiving special training in public health laboratory methods under a Foundation fellowship will become director of the service upon completion of his studies.

Honduras.—In Honduras the reorganized public health laboratory service continued to carry on satisfactory work. The one branch laboratory, which is located at San Pedro, department of Cortés, will suffice to meet the present needs of the northern part of the country with the exception of several large towns on the north coast which are served by the laboratories of the fruit companies. Eight thousand specimens were examined in 1928.

Nicaragua.—Aid was continued by the Foundation towards the maintenance of the division of public health laboratories of the national Health Department of Nicaragua. The organization of the eighth branch laboratory, which is situated in Bluefields on the eastern coast, has completed a program of laboratory service for practically the entire country. Approximately 50,000 specimens were examined during the course of the year; 69 per cent of the examinations were made in the interests of public health. The prevention of typhoid fever was stressed; quantity production of triple-typhoid vaccine by the central laboratory permitted the inoculation of more than 12,000 persons in Managua, and several

thousand vaccinations were given at the departmental health offices, which were furnished with the vaccine. Further experience was secured in the use of the Kahn precipitation test for the diagnosis of syphilis. Facilities for the training of personnel continued to be offered by the central laboratory at Managua. The government provided the land and necessary funds for the construction of modern quarters for the central laboratory. This building will also house the vaccine institute.

South America

Colombia.—The second year of the three-year period for which the Foundation agreed to assist the Government of Colombia in developing a national public health laboratory service was completed in 1928. Assistance was continued towards the salaries of the director and the assistant director of the service. During the year the service was transferred from the Ministry of Education to the national Health Department, which represents a step forward in unifying the government health services.

Europe

Hungary.—The activities of the State Hygienic Institute at Budapest, Hungary, towards the maintenance of which the Foundation is

contributing funds, have increased in volume and broadened in scope. Approximately 50,000 examinations were made in the laboratories of the institute and at seven branch laboratories which have been installed throughout the country. The director of each branch laboratory studied laboratory methods at the institute. Three of the branches, namely, those at Pecs, Debreczen, and Szeged, are operated in connection with the departments of hygiene of local universities; the remainder are conducted in conjunction with the city hospitals.

Turkey.—During the year a law was ratified creating at Angora, Turkey, the Central Institute of Hygiene of the Turkish Republic, which, with the aid of four proposed branch laboratories, will provide a general public health laboratory service for the entire country. Towards the cost of installing and equipping the main building of the institute, the Foundation paid its pledge of $80,000. The chemistry laboratory was in operation by the end of 1928; the bacteriological division will begin to function early in 1929.

The East

China.—For several years a representative of the Foundation in China has served in an advisory capacity to the National Epidemic Prevention Bureau in Peking, which conducts a

Photograph Excised Here

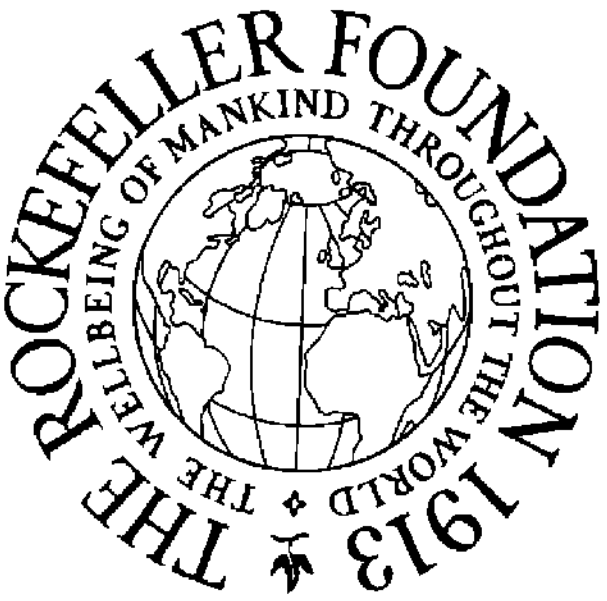
State Hygienic Institute, Budapest, which, with seven branch laboratories located in different parts of Hungary, provides a nation-wide public health laboratory service. The Foundation is contributing towards the maintenance of this institute over the five-year period, 1927–1932.

public health laboratory in the Temple of Heaven. The usefulness of this laboratory in preventing disease was illustrated during the past year, when the Department of Public Health of the municipality of Greater Shanghai administered to 110,000 persons free anticholera vaccine prepared by the laboratory.

Philippine Islands.—The Foundation's cooperation with the Bureau of Science in the Philippine Islands was continued. The bureau is now prepared to examine all types of laboratory specimens free of charge, a service which is proving very popular among physicians in Manila. Plans have been matured to extend this diagnostic aid throughout the provinces by establishing a mailing system and creating a number of provincial branch laboratories at strategic points.

The United States

In the United States the Foundation had opportunity to render timely financial aid to four central state laboratories during 1928. A small grant to Missouri enabled the state Health Department to maintain the high standard of laboratory service which it has achieved. In Oklahoma and Texas the salaries of the state laboratory directors were supplemented until the state legislatures could appropriate the funds necessary to maintain them at the desired



Photograph Excised Here

Two of the five buildings constituting the new medical center at Angora, Turkey. At the left is the Central Institute of Hygiene, towards the equipping of which the Foundation contributed $80,000.

levels. The services of an additional technician were made possible by a temporary grant to the South Carolina State Laboratory. Two branch laboratories in Louisiana and Tennessee also benefited by limited financial assistance.

Epidemiology

Europe

Denmark.—According to a three-year agreement with the Government of Denmark the epidemiological bureau of the central health service was assisted by a grant from the Foundation to meet the salary and travel expenses of the epidemiologist. Aid from the Foundation also provided additional personnel for this bureau, which was thus able to cooperate with local health officials in preventing the spread of communicable diseases. As the result of epidemiological studies by the bureau, prompt measures for the control of several outbreaks which occurred during the past year were successfully instituted.

The United States

A competently directed division of epidemiology has long been recognized as an essential service of every well-organized state health department. Despite this need of well-trained epidemiologists, their absence in many state

organizations has been noticeable. Epidemiology has, therefore, proved a fruitful field in which the Foundation could stimulate progress in state health services and assist materially by supplementary financial aid of a temporary nature. During the past year new divisions of epidemiology were established or reorganized with Foundation assistance in Kentucky, Mississippi, Montana, North Carolina, North Dakota, and Utah. Financial assistance was continued in South Carolina and Texas.

Sanitary Engineering

Central America

The national health departments of Costa Rica, Honduras, Nicaragua, Panama, and Salvador now have services of sanitary engineering. The Foundation's sanitary engineer who maintains headquarters in Panama continued during 1928 to give the technical assistance in this field solicited by these departments.

Costa Rica.—In Costa Rica a division of sanitary engineering under a former fellow was created in the Ministry of Health in September 1928. Progress was made in various projects relating to water-supplies, sewage disposal, and antimalaria drainage. Plans were formulated for the improvement of water-supplies in the suburbs of San José.

Honduras.—A trained Honduran engineer assumed direction of the division of sanitary engineering of the Health Department of Honduras early in 1928. The Foundation's engineer aided this division by making a careful survey of a sanitary engineering project at Puerto Cortes on the north coast; he also advised regarding the maintenance of the water chlorinating plant and the construction of a sewage system at Tegucigalpa and was consulted on plans to improve water-supplies in Amapala.

Nicaragua.—In Nicaragua the Foundation's engineer collaborated with the national Health Department in developing a program of general sanitation at Bluefields; a preliminary study of sanitary conditions was made and plans were completed for the installation of sewerage. He was also able to assist the division of sanitary engineering and sanitation by supervising the construction of the municipal sewage system of Managua and promoting the purification of public water-supplies in Managua, Granada, Leon, and other towns.

Panama.—According to a cooperative agreement with the Government of Panama which terminated at the close of 1928, the Foundation's engineer continued to assist the sanitary engineering division of the Department of Health in solving problems in sanitation, as, for example,

water-supply improvement and malaria drainage measures at Santiago, San Francisco, Aguadulce, and Penomene, the construction of a new type of portable pit latrine for rural use, and the extension of sewage systems.

Salvador.—The water-supply problems of the Health Department of Salvador were given special attention and study by the Foundation's engineer. He was instrumental in securing the adoption of chlorination at Santa Ana, which has proved a successful method of purification. He also made a survey of the water-supply of the city of San Salvador and presented recommendations for a new system.

The East

Ceylon.—In Ceylon a Foundation sanitary engineer whose services have been lent to the government continued to act as director of the division of sanitary engineering of the Department of Medical and Sanitary Services. A deputy sanitary engineer who is carrying on further studies under a Foundation fellowship will assume the post of director of this division when the Foundation's representative is withdrawn. The division works in cooperation with the departments of Public Works and Irrigation. Its outstanding activity during 1928 was the securing of safe water-supplies; plans for several important proj-

ects were well advanced at the end of the year. Antimalaria work also received attention. A number of urban district councils and local boards requested assistance in developing town drainage schemes, but lack of engineering personnel precluded the initiation of such work.

The United States

During 1928 the state health departments of Idaho, Indiana, North Dakota, and South Carolina were aided by the Foundation in their sanitary engineering activities. In all the states progress was made in dealing with the fundamental public health problems connected with water-supplies and sewage disposal. In certain of the states special attention was given to milk sanitation and stream pollution by trade wastes.

Vital Statistics

Europe

Denmark.—In Denmark creditable results have been accomplished in the field of vital statistics during the past three years. The Foundation's cooperation with the bureau of vital statistics in the central health service of the country has been extended over another three-year term, beginning January 1, 1929; financial aid will be given on a declining scale.

Yugoslavia.—To assist the Ministry of Health

of Yugoslavia to develop an effective bureau of vital statistics the Foundation approved a contribution of funds over a five-year period towards a program of local training of personnel. During 1928 a group of twelve students, including ten fellows in statistics, attended two intensive courses of six weeks each at the School of Public Health and the Institute of Hygiene of Zagreb; this training was followed by a practical four weeks' course in the statistics of communicable diseases at the Central Institute of Hygiene in Belgrade. To complete their year of training the fellows were subsequently assigned to the nine institutes of hygiene located in various parts of the country. This trained personnel will enter the government statistical service as full-time employees.

The Foundation contributed funds for the purchase of the mechanical equipment which the central bureau of statistics at Belgrade and other centers required for the proper study and analysis of statistical data collected in the field.

The United States

At the beginning of 1928 Georgia, New Mexico, and Texas were among the eight states not in the birth registration area of the United States and among the six states not in the registration area for deaths. In order to aid these

states in meeting the requirements for early admission to the registration areas the Foundation provided funds to enable them to enlarge their divisions of vital statistics. A small contribution to the divisions of vital statistics in Mississippi and Tennessee permitted these states to carry on special studies.

At the end of the year only four states remained outside the birth and death registration areas. Foundation assistance contemplated for 1929 will further promote the plan of having every state in the registration areas by 1930, a goal towards which the United States Census Bureau and the individual states are striving. A special committee of the American Public Health Association by its counsel and the obtaining of funds has played an important rôle in this movement.

Bureaus for Study and Reform of Public Health Activities

Europe

National Office of Social Hygiene, France.—In France for the past four years the Foundation has aided the National Office of Social Hygiene, a semi-official division of the Ministry of Labor, Hygiene, and Social Welfare. Through its various services the office has played a stimulating and useful rôle in modern public health progress in the country, as shown by the fact that at the end of 1928 departmental health services,

each with at least one full-time health officer, were operating in fifty-eight of the ninety-three departments, whereas only thirty-eight departments had full-time officials when the office began its work in 1925.

During 1928 the service of technical studies and departmental investigations assisted approximately thirty departments in organizing their health activities and securing personnel, maintained relations with important national and international health organizations, investigated the various public health projects submitted to the national office for consideration, completed a comparative study of midwifery and maternal mortality in all departments, collaborated with the statistical service in preparing maps and charts, undertook the publication of a sanitary year-book containing summaries of departmental health surveys, and prepared a complete list of all prenatal and infant consultations in each department for the national child welfare campaign.

The information service of the office began collecting all data relating to health legislation in France; this was published in an official quarterly bulletin for the first time in 1928. That the French colonies were interested in the service of colonial hygiene which was established late in 1927 was manifested by the number of requests

for information and advice regarding certain endemic diseases among native populations.

The service designated as the general propaganda commission continued a vigorous campaign of health education. Through such media as the press, radio, moving pictures, posters, printed matter, traveling exhibits, and popular health talks, an enormous number of persons in all parts of France received information on hygiene and preventive medicine, with particular reference to tuberculosis, infant mortality, and venereal diseases. The Post and Telegraph Service of France cooperated by inserting in its calendar, of which four million copies were published, a page of practical advice on outstanding health problems. By agreement with the Department of Education of the city of Paris, a series of health commandments will be inscribed upon the covers of the exercise books of school children. A plan for a national campaign against diphtheria was prepared. The propaganda service organized a national child welfare week, which was celebrated, in July. Nearly 100,000 posters were distributed, and lists of prenatal and infant consultation services in the departments were issued to all communes in France. During the year sixteen departments were visited by the staff and 113,000 persons were reached through lectures and conferences.

The Sanitary Reform Bureau, Hungary.—The Foundation continued to support the sanitary reform bureau which was organized in 1925 in the Ministry of Public Welfare of Hungary. This bureau has exerted a marked influence in arousing general interest in public health and in promoting government reforms in this field. Since its objectives had been largely achieved, the bureau was discontinued at the close of 1928 and its special studies were assumed by the State Hygienic Institute and the new Institute and Museum for Social Hygiene in Budapest.

The activities of the bureau during the year included the establishment of a division of epidemiology and statistics in the State Hygienic Institute, the continuation of a general health survey of Hungary with special reference to its economic and sociological aspects, further studies on infant mortality and the mortality from tuberculosis during recent years, and collaboration in the preparation of scientific articles.

The Foundation cooperated with the Ministry of Public Welfare in developing the Institute and Museum of Social Hygiene, which was formally opened in Budapest in September 1928. This institute, which consists of five divisions, will organize a country-wide program of public health education and will direct child welfare programs and campaigns against infant mortality.

A lecture hall will be equipped to serve as a center of instruction for public health officers, nurses, and others. In the training of these health workers, close cooperation will be effected with the State Hygienic Institute. The section of public health education of the sanitary reform bureau will continue as a permanent division of the new institute. Special exhibits advocating measures of industrial hygiene and others discouraging superstitions and quackery have been prepared. During one month these exhibits were visited by approximately 30,000 persons.

Advisory Board, Poland.—Support of the advisory board which was organized in the Public Health Service of Poland in 1925 was continued by the Foundation during 1928. The board carried further the studies relating to tuberculosis, typhus, trachoma, and the preparation of public health statutes, which it had undertaken in previous years, and began special investigations on typhoid fever, syphilis, and industrial hygiene.

Other Health Activities

Central Technical Bureaus in Bulgaria Aided in Emergency

Disturbed economic conditions in Bulgaria made it impossible for the government to meet the increased salary schedule which was author-

ized in 1928 for the personnel of certain technical bureaus of the central health service. In order that these bureaus might retain the services of specially qualified men, among whom were a number of returned fellows, the Foundation arranged to grant financial assistance to the government over a four-year period, with the understanding that the salary level operating at the close of the period would be maintained.

Cooperative Projects in Jamaica Are Directed by Bureau of Health Education

The Bureau of Health Education of Jamaica, which is directed by the Foundation's representative in the colony, is considered one of the most active and important features of the present cooperative program. The bureau not only constitutes the central government agency for disseminating health information but also administers the various cooperative projects. To meet the constantly increasing demands for educational material, the bureau has further extended the scope of its work. Thirty-one different health publications in the form of bulletins, pamphlets, posters, placards, and letters were issued and a total of 205,000 pieces of health literature were distributed during 1928.

The monthly circulation of the official bulletin, *Jamaica Public Health*, has been increased seven-

fold within two years; its circulation during the past year exceeded 15,000 copies. Forty-one foreign countries from Canada to West Africa and the Far East have sent in requests for this publication. In Jamaica it is used as a textbook on hygiene in more than 200 elementary schools.

A division of prenatal work was organized in the bureau during the year, and more than two hundred expectant mothers were reached by a series of specially prepared letters of advice and instruction. The bureau continued to provide suitable lecture material and equipment for the use of medical officers of health, schools, churches, and societies throughout the island. In conjunction with a tuberculosis survey which was made in 1928, the prevention of this disease was particularly emphasized; the subject formed the chief item of the Empire Health Week program which was carried out in every parish in the colony.

School Hygiene.—The school hygiene program in Jamaica has been directed by the Bureau of Health Education since 1925. At the beginning of the past year the parishes of St. Andrew and Kingston incorporated in their permanent health organization a school hygiene program which included dental clinics. The public health activities in the schools have comprised treatment for hookworm infestation, the operation of dental

clinics in four parishes, the teaching of hygiene as a part of the curriculum in every school in the colony, and school sanitation.

The school dental clinics represent an important feature of the program. With the aid of the Foundation, this work was extended to the parishes of St. Mary and Trelawney in 1928, and during the past year clinics were held at thirty-five schools in the four parishes; 5,778 pupils received a total of 14,802 dental treatments. The volume of work in 1928 was more than double that of the previous year.

The work of improving the sanitary conditions of school buildings has been extended, and the proper use and maintenance of school latrines have been constantly stressed. The government continued to provide one-half the cost of latrines built at the subsidized church schools.

Tuberculosis Survey.—Tuberculosis is known to be an outstanding public health problem in the West Indies. In Jamaica it is estimated that 50 per cent of the mortality among persons between the ages of twenty and forty years is due to this preventable disease. Since Jamaica presented a favorable field for a thorough study of tuberculosis, the Foundation, at the request of the government, undertook a survey of the disease in the colony, furnishing the services of a recognized authority, Dr. Eugene L. Opie of the

Henry Phipps Institute, Philadelphia, as director of the work. In addition, the Foundation assisted in the support of a tuberculosis study clinic and provided a small fund for general expenses; the government provided dispensary quarters, supplies, and other facilities for promoting the investigation.

The tuberculosis study clinic was opened in July at Kingston for the purpose of securing information regarding the prevalence, nature, and mode of spread of this disease in Jamaica. The staff consisted of a medical director, three nurses, two of whom were supported by local funds, and clerical personnel. This clinic has been highly successful in diagnosing cases of tuberculosis in its early stages, in instructing patients regarding treatment and the proper measures for preventing the spread of the disease, and in stimulating the interest of local physicians. In six months 527 patients were examined at the clinic, and of these, 255 were found to have tuberculosis; tuberculin tests were made on 811 persons who had been in contact with patients; 595 sputum examinations were made; and the visiting nurses made 1,141 home visits to 143 families in which there were tuberculous persons.

The survey has shown that an acute and rapidly fatal type of pulmonary tuberculosis, which is seldom seen in Europe or in the United States

except in very young children and negroes, occurs frequently among young adults in Jamaica. This discovery has emphasized the need for a thorough investigation of the conditions which favor the spread of the disease on the island. That the survey has stimulated an active interest in the prevention of the disease is shown by the fact that the parishes of St. Andrew and Kingston have already arranged for better housing of their dependent tuberculous patients. Furthermore, there was a decided increase in the number of cases reported during the later months of 1928. An antituberculosis association, established under private auspices, has cooperated actively with the officials of the survey, contributing funds for salary and travel of a visiting nurse and for the relief of needy patients. It is hoped that the findings of the survey will provide a sound basis for the development by the government of a permanent island-wide antituberculosis program adapted to the social and economic conditions of the colony.

Surveys and Consultation Services in the East

Cooperation Extended in India.—In India, where the Foundation has cooperated with the governments of the states of Madras and Mysore, collaboration was extended during the past year to other divisions of the country.

Reconnaissances of the public health organizations in the provinces of Burma and the Punjab and in the state of Travancore were made by Foundation representatives at the request of the respective governments. The director of the Department of Health of Burma was given opportunity to observe public health activities in the United States and other countries as a guest of the Foundation, and subsequently the government invited the Foundation to undertake a health survey of the province with a view to reorganizing the public health service now in operation. An official invitation for Foundation assistance in making a public health survey of the state of Travancore was also received.

In the state of Mysore a working agreement with the government was approved in 1928 for a two-year period, in accordance with which the Foundation has arranged to provide the services of a consultant in public health and a sanitary engineer. A fellowship in sanitary engineering will also be granted and funds will be contributed towards the operation of a rural health demonstration and malaria field stations. Before the close of the year a member of the Foundation field staff had entered upon his duties as consultant to the government and two malaria field stations had been established.

Sarawak, Borneo.—Following a comprehensive

survey of health conditions in Sarawak, a British territory of North Borneo, by a field representative in 1927, the Foundation, in 1928, approved a proposal to lend the services of a member of its staff as consultant during the reorganization of the public health service. Owing to financial conditions in the colony, however, the government has been obliged to postpone the undertaking.

VII

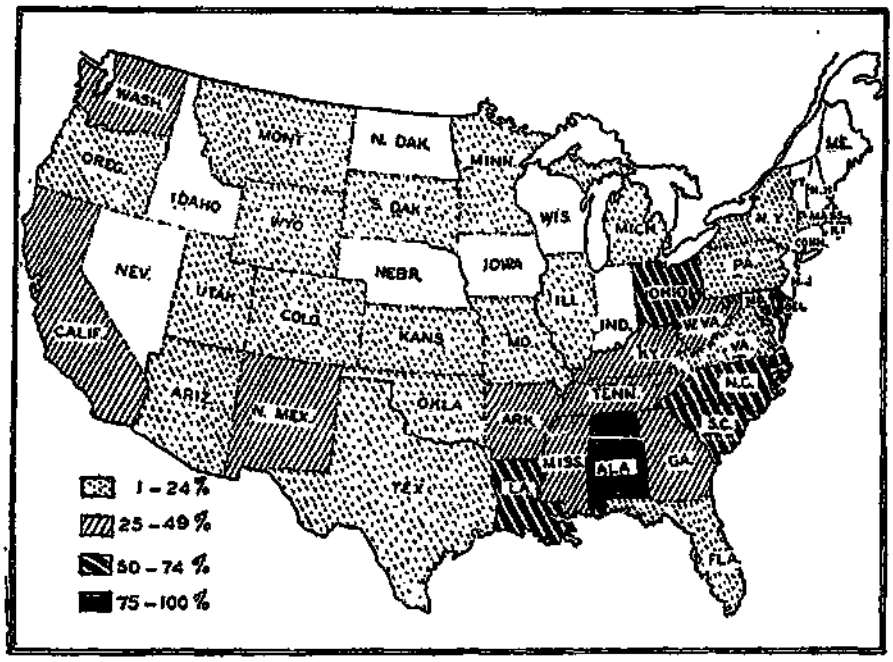
Rural Health Work

Through the provision of funds, advisory service by field representatives, or training opportunities for personnel, the Foundation aided the development of local health organizations in the United States and in twenty-one foreign countries in 1928.

County Health Departments in the United States

At the end of the year there were 462 full-time county health departments in thirty-five states of the United States, each of which had a health officer and at least one assistant. Although remarkable progress has been made in the past decade in extending health service to rural areas, much remains to be done when the total of 3,087 counties in the United States is considered. The results already accomplished appear slightly more favorable, however, when it is understood

that the 462 counties with full-time services have among their residents approximately 24 per cent of the country's rural population.



Percentage of rural population of the United States served by full-time county health organizations during 1928.

In viewing the development of county health work in the United States, it is necessary to remember that in the administration of public health the states are forty-eight sovereign units and the experiences gained in one state cannot be put to use in a less progressive state except by the process of demonstration, education, and slow growth. In a limited number of states rural health service has not only been amply demonstrated but it has approached a stage from which its state-wide expansion can be reasonably ex-

pected in the not distant future. On the other hand, thirteen states still have no full-time county health departments or other adequate form of rural health service; six states have only one such local organization.

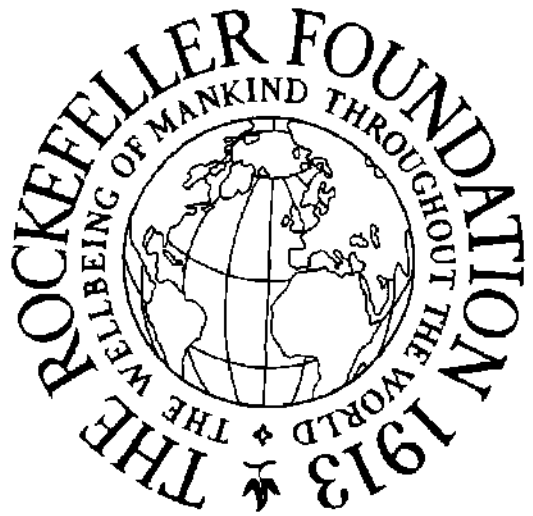
Permissive Laws.—State permissive legislation, or enabling acts which authorize the counties to make necessary appropriations, is the logical first step in the adoption of county health service. Nine states now have permissive laws. Although some states have established county health units without such enabling acts, greater security and a more rapid development usually follow their passage. Permissive legislation has also paved the way for the states to participate in the financial support of the county departments. This cooperation by the state is desirable in order that the responsibility of the local health workers to the state officers may be maintained, and it is a necessity in all but the more prosperous counties.

Number of Counties Aided.—Of the 462 full-time county health services in operation in 1928, the Foundation aided 191 through their respective state organizations. These departments were located in twenty-four states. An additional 103 county departments were indirectly aided by Foundation assistance to central divisions for county health work. These divisions

of the state health departments were responsible for the supervision and promotion of rural health work in fourteen states.

Flood Area Services.—In the group of 191 counties in which health departments were aided by the Foundation were included eighty-two counties in the seven states inundated by the Mississippi flood of 1927. The financial cooperation of the United States Public Health Service and the Foundation has enabled the states and counties to maintain all of the original eighty-five flood area health services, and their continuance on a permanent basis was assured at the beginning of 1929 by the necessary local appropriations. During 1928 the Foundation pledged support to the states for these services for a five-year period at an annually decreasing rate which will permit the complete withdrawal of funds at the end of 1932.

The reports from seventy-seven flood area health services in five states showed the following round figures with regard to specific accomplishments in 1928: lectures, 7,500; visits to patients with communicable diseases, 14,200; tuberculosis examinations, 2,200; venereal disease examinations, 5,300; prenatal examinations, 1,600; home visits by public health nurses, 26,500; infants examined, 16,200; school children examined, 166,000; immunizations against typhoid fever,



Photograph Excised Here

In this rural home in the United States, which was unscreened and had an insanitary well and latrine, there were seven cases of typhoid fever, with three deaths.

Photograph Excised Here

The same home provided with screens, a safe water-supply, and a sanitary latrine, as a result of the efforts of the staff of the full-time health department which is now functioning in the county.

236,000, against smallpox, 105,000, against diphtheria, 160,000; dairy inspections, 3,900; cows receiving tuberculin tests, 4,200; sanitary privies installed 16,600; new sewer connections, 3,000; and septic tanks installed, 500. These activities typify the work of many other county health organizations. Antimalaria work and other special problems are, of course, featured where they are of outstanding importance.

State-wide Project in Alabama.—In Alabama a definite schedule for the state-wide extension of county health work is being effected. Fifteen new county health departments were established in 1928, which leaves only nineteen of the state's sixty-seven counties to be organized. According to agreement, the Foundation has assisted during the development of this project which enables the poorer or economically backward county to benefit by a relatively greater amount of state aid than that given to the more prosperous county and thus to enjoy the advantages of full-time rural health service.

Three Provinces of Canada Provide Rural Health Service

Quebec Leads in Rural Organization.—Ten rural health organizations in twelve counties of three Canadian provinces—Quebec, British Columbia, and Saskatchewan—were assisted by the

Photograph Excised Here

Modern milk-house at a grade A dairy in a Kentucky county having full-time health service.

THE ROCKEFELLER FOUNDATION 1913
WELLBEING OF MANKIND THROUGHOUT THE WORLD

Photograph Excised Here

Interior of the dairy barn erected during 1928 to comply with the requirements of the health department for grade A dairies.

Foundation in 1928 through financial contributions and the provision of training opportunities for local personnel. The provincial governments provide 50 per cent of the budgets of these organizations, while the Foundation's aid decreases with a corresponding increase in appropriations by the local authorities.

In the province of Quebec three new departments were established during the year, making a total of seven local organizations now operating in nine counties. In the past three years a favorable reduction in the general mortality rate and a remarkable drop in the mortality from communicable diseases and that among infants under one year of age have occurred in those counties enjoying full-time health service. Since a decline of similar magnitude has not taken place in the other counties, it is believed by the provincial officials that the county health department activities have played some part in effecting these favorable conditions.

British Columbia and Saskatchewan.—In the province of British Columbia, the local health organization in the municipality of Saanich, near the city of Victoria, entered upon the second year of work and creditable results were accomplished, particularly in school medical inspection and the prevention of communicable diseases. Cooperation was extended to the provincial gov-

ernment of Saskatchewan for the first time by the provision of practical field training for the personnel of the two local health organizations which were established in the districts of Gravelbourg and Assiniboia in the southern part of the province.

Mexico Enters the Field of Rural Health Work

First Department Established in State of Vera Cruz.—As an outgrowth of the hookworm campaign in the state of Vera Cruz, there was established in that state in 1928 the first permanent local health organization in Mexico. This department operated in a joint health district comprising the municipalities of Minatitlan and Puerto Mexico. Funds for its maintenance were provided by the state of Vera Cruz, the two municipalities, and the Foundation. The department has functioned successfully, with its personnel employed on a full-time basis, and is comparable to the county health organizations in the United States. The director exercises complete authority in all matters pertaining to health and sanitation in the two municipalities, and a well-rounded program of personal and community hygiene is being developed.

Activities during the first year were limited to urgent local health problems. That the population is heavily infested with hookworms was

shown by the examination of 2,215 persons, of whom only 6 per cent were found to be free from these parasites. Treatment was administered to 1,600 persons, and efforts directed against soil pollution resulted in the installation of 235 pit latrines. Inspection to assure proper maintenance of these conveniences was a routine function of the sanitary inspectors.

Malaria represents one of the serious health problems of the communities. A systematic study of the local anophelines and observations upon malaria incidence, particularly among the child population, yielded valuable data. Larvicides and medication were employed as temporary measures for the reduction of the disease. The drainage of a large lake and the filling of a swamp, which represented extensive breeding areas of *A. albimanus*, were also accomplished.

Vigorous action on the part of the newly organized health department may have averted a threatened epidemic of smallpox early in the year. More than 12,000 persons were vaccinated without additional expense to the two municipalities. Other prophylactic measures included antirabic treatments and immunization against typhoid fever. In the department's school hygiene program, the examination of school children, follow-up home visits by the public health nurses to urge the correction of

physical defects, and oral hygiene were emphasized. The outlook for the continued success of this local health organization is most promising.

Rural Services In the West Indies

Jamaica

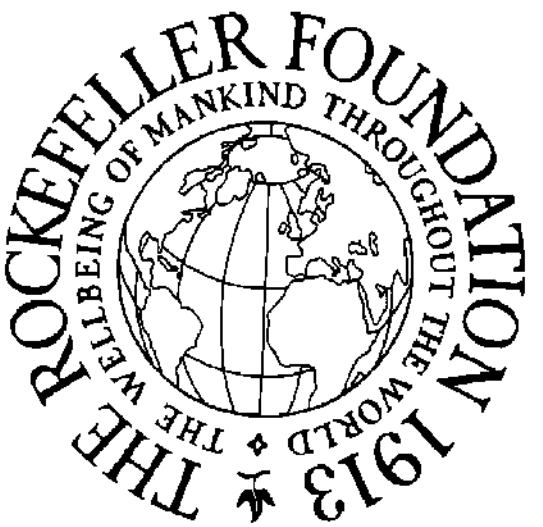
Antihookworm Campaign Gives Rise to Local Health Work.—In Jamaica the first demonstration in local health work was started in St. Mary Parish in October 1928 under the direction of the Central Board of Health with the object of developing a rural health organization suitable to the health needs of the colony and within the resources of the people. This broadened health program is an outgrowth of the antihookworm campaigns undertaken during the years 1924 to 1926 and carried on since that time as a permanent parish activity by sanitary inspectors who are paid from local funds. The demonstration, which it is planned to continue for three years, will be supported by the central government, the local Board of Health of St. Mary Parish, and the Foundation, which has agreed to provide funds to cover one-fourth of the cost of the first year's work and to contribute on a decreasing scale for the second and third years of operation.

The personnel of the unit consists of a local medical officer of health who is a former Founda-

tion fellow, a clerical assistant, and five sanitary inspectors, one for each district into which the parish is divided. Two of the sanitary inspectors hold certificates of the Royal Sanitary Institute of London, which were obtained after special training at the local school for sanitary inspectors at Kingston. Important rural health activities were well under way before the close of the year. These included communicable disease control, improved registration of vital statistics, prevention of hookworm disease, examination of foods and markets, purifying water-supplies, and popular health education. The sanitary inspectors visited more than 7,400 homes in the parish finding 86 per cent of them equipped with latrines. A total of 784 insanitary latrines were brought up to the required standards, and 149 new conveniences were built.

Porto Rico

Rural Work Extended.—In Porto Rico the Foundation continued aid towards the operation of two municipal health departments, one of which was established in the municipality of Río Piedras in October 1926, the other in Yabucoa in March 1927. Late in 1928 similar organizations were established by the insular Department of Health in the municipalities of Caguas and Cataño. While these two municipalities



Photograph Excised Here

A public health nurse at the child welfare dispensary of the Mokotów Health Center, Poland, instructing a group of mothers in the proper method of bathing a baby.

Photograph Excised Here

Physician making an examination at an infant welfare clinic at the health center in the town of Hartberg, Austria.

contributed funds towards the budgets of the new departments, the greater portion of the expenditures was borne by the central government. The Foundation's representative served as acting director of the work. Funds were provided for the salary and travel expenses of a public health nurse to supervise the public health nursing activities of the health departments of Río Piedras and Yabucoa. Before leaving for Porto Rico she was given opportunity to observe work being done in this field in the United States. The director of the Yabucoa department spent several weeks in the United States as a guest of the Foundation in order to study county health organizations.

In Río Piedras and Yabucoa efforts were directed towards strengthening the health activities already in progress and broadening the programs to include other essential services. A new system of filing birth and death statistics was devised for use in Río Piedras to make this information readily available for the health officers. Communicable disease control remained an important function in both municipalities. As a result of the intensive campaign of immunization against diphtheria, every pupil in the schools of Río Piedras had been reached before the end of the year; similar work was also well under way at Yabucoa. Medical inspection was

Photograph Excised Here

This float, illustrating infant welfare work, was one of the entries in the public health pageant held during 1928 in Skierniewice district, Poland.

Photograph Excised Here

Clinic at one of the child health stations operated in Rio de Janeiro, Brazil, by the bureau of child hygiene of the national Department of Health. The public health nurses who serve at these stations are graduates of the D. Anna Nery School of Nursing.

continued in the lower grades of all schools, and in Yabucoa certain features of the examination were extended to all the pupils. The reorganized school dental service in Río Piedras was limited to first-grade pupils except for emergency measures among the older children. More than 1,800 dental treatments were given to approximately 1,100 pupils by a dentist devoting part of his time to this service. In cooperation with the department of public instruction, illustrated lectures were given and moving pictures were shown at the schools, teachers' conferences, and public gatherings. Outside the schools, health literature was distributed among clinic patients and informal conferences were held.

The building and equipment of the Río Piedras municipal health department did not suffer serious damage from the hurricane of September 13, 1928, but for several weeks the personnel participated in emergency and rehabilitation measures. Very different conditions prevailed at Yabucoa, where the headquarters of the department were completely destroyed and nearly all the rural homes entirely demolished or too badly damaged to serve even as temporary shelters. In spite of widespread destruction the health department began to function immediately in provisional quarters and undertook a campaign of vaccination, with the result that

more than 1,100 persons were immunized against typhoid fever and approximately 2,500 were protected against smallpox. Following the hurricane a sickness survey was made in both urban and rural zones, but beyond an increase in malaria no evidence of epidemic disease was disclosed.

In Yabucoa a study of the types of illness which cause absence from school was undertaken during the year with a view to planning measures for their reduction. A sanitary survey of the entire urban zone, which covered a period of three months, demonstrated the urgent need for more effective sewage disposal in certain portions of this area.

A Beginning Made in Central America

Costa Rica

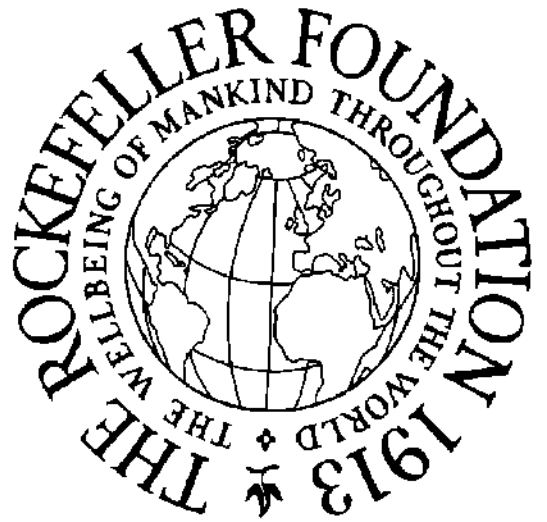
Local Organization in San Ramon. In Costa Rica the success of the hookworm campaign has stimulated the government to take steps for improving local health conditions. During the past year the first county health organization in the republic was created in San Ramon, a district in the province of San José, not far from the capital city. A representative of the Foundation has been able to advise the government regarding this undertaking during his visits to Costa Rica. The project is being financed

without outside aid. A beginning has been made in draining swamps and improving general sanitary conditions in the area.

Rural Health Service in South America

Brazil

County Organization in Two States.—For seven years the Foundation has assisted two states in Brazil, Minas Geraes and São Paulo, in establishing rural health activities. In 1928 a total of twenty-one counties received aid, twelve in São Paulo and nine in Minas Geraes where four new departments were installed. The county health service in the state of Minas Geraes passed to the administrative control of the state early in the year. The former head of this service was appointed chief of the section of rural and urban hygiene and epidemiology, and under his direction the county health program of the state has made rapid progress. Organized county health departments were operating in twenty-three counties at the close of the year. In addition there were six health centers in the larger cities, each of which supervised the health activities of several adjacent county areas. Definite plans have been made for seven new departments in 1929; towards four of these the Foundation has voted funds, while three will be entirely supported by the state and municipalities.



Photograph Excised Here

Testing school children for tuberculosis by the Pirquet method in the district of Holesov, province of Moravia, Czechoslovakia, where the Foundation is assisting the authorities in a health demonstration.

Photograph Excised Here

Administering anatoxin, for the prevention of diphtheria, to school children in Seine-et-Marne, one of the five departments of France in which the Foundation is aiding in the development of full-time health service.

The volume of work accomplished in 1928 by the county health departments in Minas Geraes aided by the Foundation showed a decided increase over that of the previous year. At the dispensaries, approximately 80,000 treatments were given to 35,000 persons; of these treatments, 43,000 were administered for intestinal parasites and 28,000 for venereal diseases. Smallpox vaccinations were increased more than threefold over those for 1927, a total of 32,800 being given. School hygiene is considered primarily a function of the state department of education in Minas Geraes, but arrangements have been made for the county health departments to conduct this activity where no school health work is carried on by the department of education.

In São Paulo the Foundation's five-year period of cooperation terminated on December 31, 1928, and the county health departments were officially turned over to the state sanitary service. During the past year popular health education was stressed in the rural health service in this state. Special attention was also given to the destruction of mosquito breeding-places in all twelve counties assisted by the Foundation.

An Experiment in Paraguay.—Organized rural health work was introduced in Paraguay during the past year, and the experiment is believed to have demonstrated that this type of local health

Photograph Excised Here

Class in a Vera Cruz school receiving instruction in the proper method of brushing the teeth. The teaching of oral hygiene in the school is one of the features of the public health program which is being developed by Mexico's first local health organization, established in the state of Vera Cruz in 1928.

Photograph Excised Here

In the county of Curvello, one of the nine counties of the state of Minas Geraes, Brazil, maintaining full-time health services with the aid of the Foundation, the establishment of a school organization known as the "Health Crusaders" has greatly stimulated the school children to strive for better health and to observe the simple rules of hygiene.

service is practicable. Under the direction of a former Foundation fellow, a county health organization was established in January in Itá. The program of the unit included permanent sanitation, hookworm treatments, and a study of the intensity of infestation with intestinal parasites. A health survey, which gave some general information regarding the distribution and incidence of malaria, typhoid fever, dysentery, goiter, leprosy, and tuberculosis, was an important accomplishment. A beginning was made in school hygiene, but the difficulties involved in this work were great because local medical service is not available in the area. The school children were weighed and measured, and results were recorded. These statistics represent the first data of this kind obtained in Paraguay.

Although the organized health work made very favorable progress, disturbed political conditions necessitated its suspension at the end of 1928.

Eight Countries of Europe Aided in Local Health Work

Since 1922 the Foundation has aided various countries in Europe to develop modern local health organization by contributing funds over a limited period of years on a decreasing scale and making available the services of field repre-

sentatives as advisers to the governments in connection with this work. During 1928 a total of sixteen public health demonstrations in seven countries, namely, Austria, Bulgaria, Czechoslovakia, France, Hungary, Irish Free State, and Poland, received assistance. Funds were also granted towards equipping rural health centers in Yugoslavia.

Austria

Child Welfare Emphasized.—The rural health demonstration in the district of Hartberg, Austria, completed its third year in July 1928. Five health centers have been established in the district. These are located in the town of Hartberg and in the villages of Neudau, Friedberg, Vorau, and Pöllau. At these centers attention has been focused on infant and child welfare work and the prevention of tuberculosis. During 1928 a service for expectant mothers was introduced at each of the centers. A total of 739 preschool children attended eighty-three consultations, and 2,058 visits were made to the homes of these children by the public health nurses. School medical inspection was conducted in the first three grades of twenty-six schools in the district, reaching over 1,500 pupils.

Unusual opportunities for improving health conditions are offered the public health nursing

service, which is conducting the first rural nursing program undertaken in Austria. A family survey of the entire district was completed by the service during the year. One of the duties of the nurses is the supervision of the health of foster children and state wards. The assigning of this function to the district health service in Hartberg represents an important administrative advance in child welfare work in Austria. The nurses possess legal authority to secure family support of state wards where possible and to fix nutritional and hygienic standards for these children. More than 2,700 foster children were under supervision before the close of the year. An intensive program of popular health education was continued. A film based upon the infant and child welfare work at the Hartberg center was completed and has already been shown outside the district.

The success of this demonstration has stimulated similar efforts in a nearby community, where a health center was established during 1928 with the aid of the Hartberg health officer.

Bulgaria

Preparations for Health Demonstration Completed.—To assist the Government of Bulgaria in developing a rural health program, the Foundation voted funds late in 1928 towards the estab-

lishment of a health center at Sofia which is to serve for demonstration purposes and as a training center for public health personnel. The city Health Department and the health insurance department of the Ministry of Labor are also cooperating in this demonstration, which will be carried on in an area in the northwestern part of the city having a population of approximately 25,000. Before the end of the year, a suitable building in a desirable location had been remodeled for the center, the personnel had been appointed, and the equipment secured. The center will begin to function early in 1929 under the direction of a former Foundation fellow.

Czechoslovakia

Varied Activities Under Way.—Two public health demonstrations in Czechoslovakia were assisted by the Foundation in 1928, one in the district of Holesov in the province of Moravia and the other in Vrsovice, an outlying district of Greater Prague. The demonstrations have aroused an interest in local health organization in other parts of the country.

A distinctly rural health service has been operating in the district of Holesov since May 1927. Antituberculosis work, infant and child welfare, and school medical inspection have been the chief activities. The incidence of tuberculosis is

high in this area, and during 1928 a total of 8,700 visits were made to clinics in three towns of the district by persons who sought examination and advice. More than 4,000 physical examinations were made among children in the schools of Holesov and Bystrice, the two largest towns, while the dental dispensary cared for 918 pupils. At the five child welfare clinics in the district, 2,700 children were examined and supervised. The problem of malnutrition received serious consideration, and a study of endemic goiter was begun in the mountainous section and in the valley of the Rusava. A travel grant from the Foundation permitted the director of the demonstration to visit public health activities in Yugoslavia.

Additional local support has been secured for the Holesov demonstration through a special system of taxation for school districts and villages. During 1928 a significant administrative reform was effected in Czechoslovakia whereby each of the five provinces will enjoy greater autonomy in the disbursement of local funds, a change which should facilitate the extension of rural public health work.

In Greater Prague further progress was made in coordinating the program of the Vrsovice demonstration with the activities of the federation of public health and social agencies. Special at-

tention was given to school medical inspection by the demonstration workers, and a clinic was equipped in each of the two schools. At the school dental dispensary 757 children received dental care. In reorganizing infant and child welfare work in the district the needs of the rural sections were recognized: two child welfare dispensaries with medical and nursing personnel were opened in Strasnice and Hostivar. Nearly 10,000 children were examined and advised during the year; the establishment of two additional dispensaries is contemplated.

Communicable disease control is another important public health problem receiving careful study. An improved system of morbidity reporting is being developed by the chief medical officer In cooperation with the State Institute of Public Health in Prague, which furnished free vaccine, an extensive campaign against diphtheria was vigorously pushed during 1928. Because of virulent outbreaks, the popular response to this activity was favorable, and more than 1,500 children were protected against the disease.

To meet the increasing need for prenatal care, a special service for expectant mothers was started at Vrsovice in November under the direction of an obstetrician who is aided by the nursing staff. All births in the district are reported immediately by the registrar to the central office of

the demonstration; home visits are made by the nurses to bring both mother and child under the supervision of the child welfare clinics. A more effective organization of the public health nursing service has greatly increased the amount of home visiting. The demonstration area was first used for practical field training during 1928, when several students from the State School of Nursing in Prague and the Prague School of Social Work were attached to the nursing service.

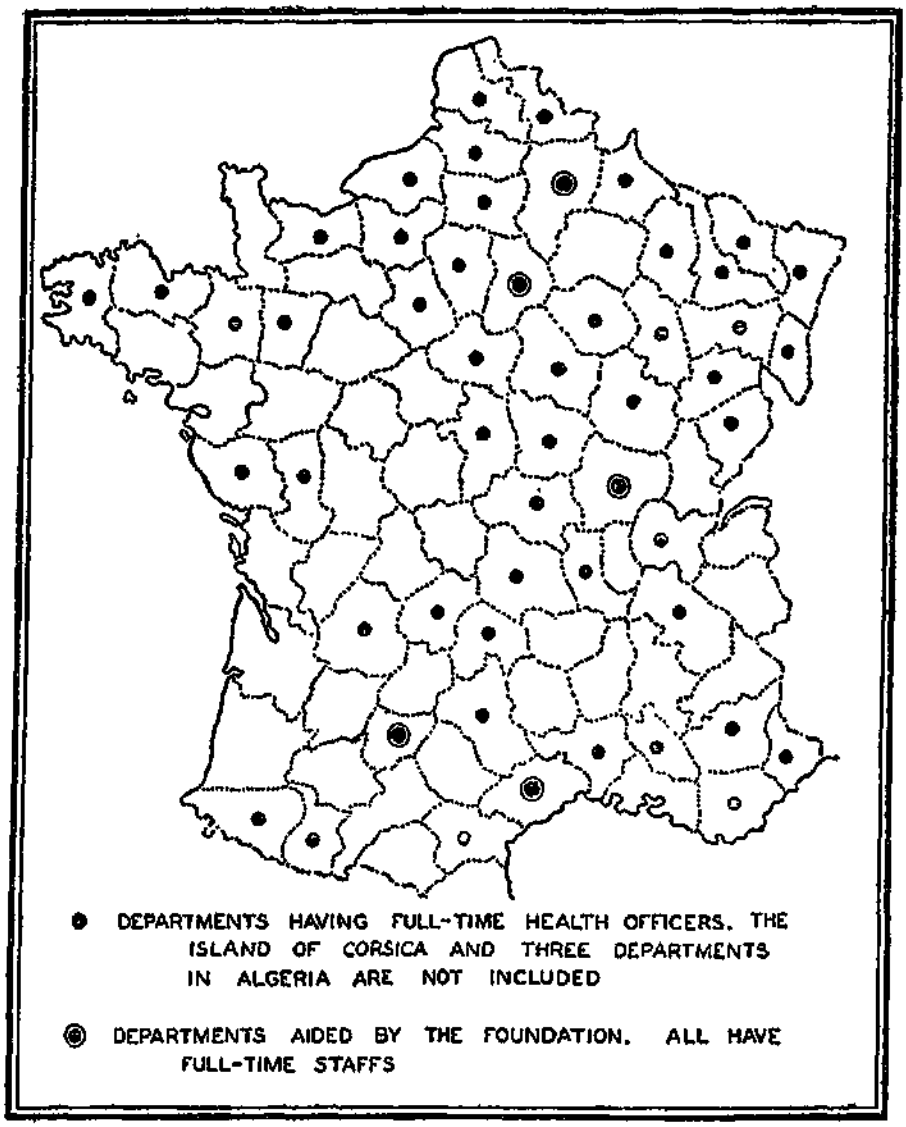
The occasion of the celebration of the tenth anniversary of the Republic of Czechoslovakia during the past year afforded a unique opportunity to promote popular interest in health work. A pamphlet describing the activities in the Vrsovice district was widely distributed, and a health contest was organized in which 360 children, ranging in age from infancy to six years, participated.

France

Aid to Five Departments.—In France the Foundation continued to assist in the development of departmental health services by cooperating with five departments, namely, Aisne, Hérault, Saône-et-Loire, Seine-et-Marne, and Tarn-et-Garonne, in demonstrations in local health work.

Department of Aisne.—In the department of Aisne, where the cooperative demonstration was

begun in 1927, health service has been steadily extended. At the end of the second year work



Departmental health organization in France during 1928.

was under way in the arrondissements of Laon, Soissons, and Château-Thierry, and the central office had been moved to more commodious quarters. During the year two assistant health officers were added to the staff. Five nurses

were also appointed, making a total of twenty-two nurses on the departmental staff, as compared with nine in 1926 before the demonstration was established. Two additional health officers and two public health nurses will join the staff at the beginning of 1929. Provision of satisfactory motor transportation for the personnel has greatly facilitated their work, and other departments are reported to be considering the adoption of a similar method of travel.

In the department of Aisne the prenatal service is unique. Any expectant mother may make three visits to a private physician of her choice at certain periods during pregnancy for examination and advice; the department pays a specified sum to the physician for each consultation. During 1928 approximately 3,000 such visits were made by expectant mothers. In infant hygiene work, close cooperation exists between the departmental health service and the division of public welfare, which administers and supports this activity. Local private physicians held eighty-three consultative clinics for infants during the year in the various communes. The public health nurses assisted at these clinics and made follow-up home visits. Parents were requested to attend the school medical inspections; from one-third to one-half responded, which permitted the physicians to discuss

with them directly the defects disclosed by the examinations.

The reporting of communicable diseases has been encouraging. Each case reported is carefully investigated by a sanitary inspector or nurse, who teaches the family how to prevent the spread of the disease. Diphtheria was rather prevalent in the fall, and approximately 1,750 children were immunized against this disease during the course of the year. In one community, 575 out of 600 children presented themselves when the public inoculation was held.

For the special features of the departmental health service there are nine well-organized and well-equipped centers in the three arrondissements. These are devoted to antituberculosis work, venereal disease control, and special examinations of school children. The amount of work accomplished by the departmental public health laboratory has shown a consistent increase; about 7,000 examinations were made during 1928 exclusive of routine tests of water-supplies.

Department of Hérault.—The year 1928 represented the fifth and final year of cooperation between the department of Hérault and the Foundation. According to agreement, the health service of the department will be entirely supported by the national and local governments

beginning January 1, 1929. The sum provided by the Foundation for the five-year period of cooperation was not entirely requisitioned during that time, and the unexpended funds will be used towards enlarging the staff of public health nurses.

At the thirteen health centers throughout the department 1,162 consultations were held during 1928, attended by 17,737 persons. The public health nursing staff made 24,998 home visits. The demonstration area in the city of Montpellier, which includes an urban and a rural district, has widened the scope of its work to include practical field training for student nurses of the local nursing school and also courses for nurses on duty in the department and in other parts of France.

A slight increase was reported in the number of cases of typhoid fever. Diphtheria also showed an increase, with one or two small outbreaks; and an intensive campaign for the prevention of this disease was initiated at the consultations late in 1928. With the aid of the practising physicians, it is expected that a large proportion of the school population will be immunized during the coming year. The anatoxin which the departmental health service furnishes free to the physicians is prepared by the regional laboratory. A local public health laboratory service is

being developed by means of a small, well-equipped laboratory installed at the central office in Montpellier with branch laboratories at St. Pons and Olonzac. A departmental laboratory has also been established at Béziers.

The efforts of the past five years to improve health conditions in Hérault have been fruitful. That the value of the health service under full-time personnel has been acceptably demonstrated is shown by the generous financial support of the governmental authorities. Through a travel grant from the Foundation, the departmental health officer studied methods of collecting and analyzing vital statistics with the Health Organization of the League of Nations during 1928.

Department of Saône-et-Loire.—In the department of Saône-et-Loire there has been a commendable growth in the public health movement during the two and one-half years in which the cooperative demonstration has been in progress. Prenatal and infant hygiene represent the chief duties of the three public health nurses of the demonstration staff. During 1928 an average of 500 infants per month came under their observation at the clinics and in home visits. Closer cooperation is being developed with the local social hygiene association, a semiofficial organization, the chief nurse of which supervises the activities of the public health nurses of the

demonstration. The service of school medical inspection is administered by the five assistant health officers. The work of these officials is somewhat hampered by the lack of public health nurses to assist them at examinations and to undertake follow-up home visits, but during the past school year approximately 30,000 children in 511 communes of the department were examined.

According to official records, the number of cases of communicable diseases reported for 1928 was considerably greater than that for 1927; this was due largely to more complete reporting. All reported cases are investigated by the three sanitary inspectors, who advise regarding concurrent disinfection. Vaccination against smallpox, according to new regulations, is performed by private physicians under the general direction of the departmental health service. Approximately 12,000 persons received this protection in 1928. Increased cooperation on the part of local practitioners has brought about an encouraging expansion of the venereal disease service, which operated five dispensaries in the larger centers of population. The volume of work accomplished by the departmental public health laboratory at Mâcon was increased considerably during the past year, and a greater number of physicians utilized its diagnostic aids. By means of a portable moving picture machine, it was possible

Photograph Excised Here

A rural community of the district of Bihac, one of the five districts in Western Yugoslavia in which local health service has been extended with the aid of the Foundation.

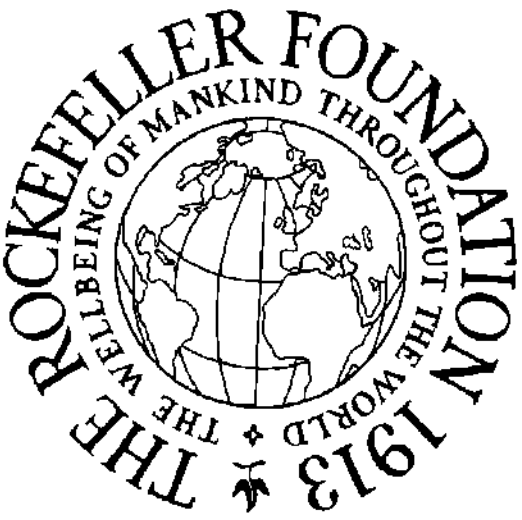
Photograph Excised Here

A group assembled outside a health station in the district of Bihac awaiting vaccination against smallpox.

to give sixty-four illustrated lectures in general hygiene in small towns and villages, and for the first time an antituberculosis Christmas stamp sale was organized in the department.

Department of Seine-et-Marne.—Progress has been made in expanding the field work of the demonstration in the department of Seine-et-Marne, which completed its third year in 1928. During the year the staff of the health service was increased by the appointment of another assistant health officer, which brought the number of these officials up to three. The chief health officer was granted a brief study trip by the Foundation for the purpose of observing infant and child welfare activities in England and Yugoslavia.

The clinics at the eight health centers of the department were well attended, and 10,000 home visits were made by the nursing service. Infant and prenatal hygiene activities were enlarged by eight new infant consultation services, making a total of fifty-seven now functioning in the department. No new health centers were installed, but official and private interest in extending such work is reflected in the plans for three additional centers to be established in the near future. The service of school medical inspection is being gradually taken over by the full-time health officers; during the year 18,000 pupils, or approxi-



Photograph Excised Here

An insanitary manure heap common in rural areas.

Photograph Excised Here

Model manure pits of this type are being installed in the vicinity of Zagreb, Yugoslavia, and in the district of Godollo, Hungary, through the efforts of the local health departments

mately one-half of the school population, received medical examination.

Communicable disease control along modern lines has been assured by the Council General, which voted to place this service in the hands of the full-time health officers and nurses in 1929. The present system of terminal disinfection will be abolished, saving approximately 60,000 francs annually to the department. An increased number of immunizations against diphtheria were given in 1928. The public health laboratory service of the department was used extensively; the number of examinations increased markedly, and almost all of them had a direct bearing upon public health.

The responsibility of supervising the sanitation of new housing developments has been placed upon the health officer of the department. This is an interesting departure which should assure the proper provision for community sanitation and a certain control in building construction.

Department of Tarn-et-Garonne.—The health organization of the department of Tarn-et-Garonne completed its second year of cooperative work in 1928. During the year opportunities for broadening their experience were afforded several members of the staff. The two assistant health officers were given travel grants by the

Foundation to study antituberculosis work, venereal disease control, and child hygiene in other parts of France, while the supervising nurse was granted a study trip to observe public health nursing activities in Warsaw and Paris.

A completely organized health center was opened in the fall at Moissac, making two centers now in operation, while a third will begin to function at Caussade early in 1929. Popular appreciation of the services rendered by these centers is manifested by a constantly increasing attendance. Aside from school children referred for special examination, most of the persons visiting the centers, particularly the tuberculosis patients, were sent by local physicians. Following the examination of school children by the medical officers of health, parents cooperated in having defects corrected; for those unable to pay, arrangements for treatment were made by the health centers.

With the exception of slight epidemics of dysentery and diphtheria, communicable disease control presented no unusual problems. There is an obvious need for improved reporting of communicable disease cases on the part of private physicians. That the diagnostic laboratory of the department has become more popular with the private practitioners has been shown by a marked increase in the number of specimens sub-

mitted for examination. Beginning early in 1929 all records of vital statistics will pass through the departmental health office and an effort will be made to secure greater accuracy in reporting the causes of death.

Health education is being slowly developed as an activity of the department. A campaign for the sale of antituberculosis stamps was undertaken under the direction of the health officer. A fête given in the interest of the center at Montauban furnished an opportunity to explain its purposes and functions. The demonstration has received the gratifying support of the Council General of the department, which approved budgets in excess of those projected in the original schedule of cooperation.

Hungary

Rural Work Progresses.—The creditable results of the public health demonstration in the district of Gödöllö, Hungary, during the two years of its existence have shown that this type of health service is well adapted to rural conditions in Hungary. The scope of the program has been broadened and the personnel increased to meet new responsibilities. A new health center in the town of Gödöllö was completed late in 1928. Besides a central office, this building provides a tuberculosis dispensary, a central

clinic for maternal and infant welfare work, a school health center, a first-aid station, public baths, and living quarters for the regular personnel and for students in training.

The systematic examination of school children was continued throughout the Gödöllö district during the year. Nutrition classes were also continued, and elementary hygiene was taught by the nurses in the schools of four villages. All school children suffering from trachoma were visited by the public health nurses to ensure their proper treatment. As a result of the tuberculosis survey of 1927 the first tuberculosis dispensary was opened in January 1928. Efforts were made to examine all members of families in which deaths from tuberculosis occurred during the past two years. Chemical and bacteriological examinations were made of the water of every public well in the district with the aid of the State Hygienic Institute at Budapest. Of the 447 wells tested, only 5 per cent were found to contain water safe for drinking purposes. Steps for the improvement of the unpotable supplies are being taken. The extensive health educational work of the Ministry of Public Welfare and the Red Cross has borne an important relation to the activities of the demonstration.

The demonstration area is being used as a training base for the school for public health

officers of the State Hygienic Institute and for students of the nurse training schools in Debreczen and Budapest. Supervised field work in rural hygiene was provided for twenty-four student health officers and five graduate nurses during 1928.

Since the beginning of the work in Gödöllö, the director of the State Hygienic Institute has been in charge of rural health activities in Hungary. The success of the demonstration has led other districts to seek assistance in planning similar programs. To meet this increasing interest, a division of field work, aided temporarily by Foundation funds, was established under a full-time director in the institute.

The Foundation has aided in financing preliminary health surveys of selected areas where similar demonstrations might possibly be organized. Surveys have been completed in two districts, Mezökövesd and Vacz, and were begun in two other areas during 1928. A public health demonstration organized in Mezökövesd in October under a full-time health officer with funds supplied by the Ministry of Public Welfare will be assisted during 1929 by the Foundation.

Irish Free State

Rural Health Work Initiated.—The creation of public health organizations in the Irish Free

State on a county unit plan was authorized by the Public Health Act of 1925, but owing to lack of trained personnel only six of the twenty-five counties in the state, namely, Carlow, Cork, Kildare, Louth, Offaly, and West Meath, have thus far appointed county medical officers of health. In 1928 the Foundation approved a program of cooperation with the government for local public health demonstrations in two counties—Cork and Kildare. Financial assistance on a decreasing scale over a period of five and one-half years will be provided by the Foundation for each demonstration; the state and county boards of health will contribute a proportionate share of the cost. Both counties are essentially rural but include a number of urban districts. The city of Cork in the former county ranks second in population among the cities of the Irish Free State.

In County Cork three sanitary districts have been established, each of which will be under the immediate supervision of an assistant medical officer of health. These officials, who were appointed late in the year, will work together for some time in the city of Cork to develop a uniform plan of school medical service and infant and child welfare activities for their respective districts. The supervising nurse, who is studying in the United States through a Foundation

fellowship, will return early in 1929 to train a staff of nurses and to organize and supervise the public health nursing service for the county. The chief medical officer of the county is a former fellow of the Foundation.

County Kildare is small and for administrative purposes is divided into two sanitary districts, a northern and a southern. Under the direction of the county medical officer of health, a former Foundation fellow, a demonstration was begun in July with school medical inspections in the town of Naas, in the northern district. In September the assistant medical officer organized a similar service together with maternal and child welfare activities in the town of Athy, in the southern district. At the time the Health Department was established a new Notification of Births Act became effective in the county, which requires physicians and midwives to report all births in both urban and rural districts to the county medical officer and the local registrar within thirty-six hours. Kildare is the first county of the Irish Free State to require the early registration of births, and the response indicates a satisfactory compliance with this law. On the report of a birth a public health nurse visits the home to give instruction in infant care and arrange for the vaccination of the child against smallpox within three months after

birth; she continues periodic home visits until the child is admitted to school. Both demonstrations are receiving official and popular support, and the outlook is promising for the development of satisfactory programs of sanitation and disease prevention.

Poland

Effective Health Demonstrations Continued.—During 1928 aid was continued to four public health demonstrations in Poland and funds were granted to the central health administration towards the development of district health work and public health nursing in the country. The rapid growth of these activities in Poland has brought about an urgent demand for suitably trained personnel, particularly public health nurses. To meet this need in part, a special nine months' course in public health nursing was opened at the School of Hygiene in Warsaw in the fall of 1928, and thirty-nine nurses were enrolled. A course of four months' duration for sanitary inspectors was also begun with a registration of thirty-five students.

Bendzin District.—In the Bendzin district, where the second year of a five-year cooperative public health demonstration has been completed, the health center idea has apparently met with favor. To extend this type of organization in

the city of Bendzin, the authorities remodeled a fine building to serve as a health center. This began to function in June 1928. The three rural health centers at Dandówka, Bobrowniki, and Strzemieszyce have accomplished satisfactory work, and in particular the public health nursing service has done much to create a desire on the part of the people for improved health conditions.

At various centers in the district, 9,100 visits were made to the clinics for trachoma, tuberculosis, venereal disease, and infant and child welfare; 5,900 examinations were conducted by the medical personnel; 2,400 home investigations were reported by the public health nurses. The school physicians gave physical examinations to 16,000 school children. Progress in communicable disease control was indicated by almost 11,000 vaccinations against smallpox and 4,300 immunizations against typhoid fever.

Mokotów District.—The demonstration in the Mokotów district of Warsaw, which is in its fourth year, is considered one of the most successful public health projects of this type in Europe. Popular approval of the health center has steadily grown; the records show an increase in registration from 926 persons in 1925 to approximately 17,000 persons in 1928, or one-third of the estimated population of the district. The full-time

personnel has been augmented by an assistant director and three nurses, making a total of eleven public health nurses and a chief nurse, all of whom are graduates of the Warsaw School of Nursing. Another psychiatrist was added to the staff of specialists giving part-time service. The demonstration area is utilized as a teaching center for student health officers, public health nurses, and others.

To permit more effective nursing service, the demonstration area was divided into ten districts, each in the charge of a nurse who has under her observation about 150 families. More than 9,000 home visits were made to young children and expectant mothers. A special study of 500 confinements in the district showed that about 80 per cent of the births took place outside of hospitals, and that most of these were attended by midwives. Closer cooperation with midwives is being sought. The problem of intemperance received special attention at the health center, and a brief period of intensive training at an antialcoholic clinic was provided for four of the nurses of the demonstration staff. The mental hygiene clinic, which was opened in 1927 to care for mentally deficient children, has proved its value; 187 children were under observation at the end of 1928. Close contact was maintained with all schools in the district, which

were advised of the results of the examinations made at the clinic.

Progress was made in communicable disease control. The typhoid fever incidence in Mokotów district, which has always been high, is now only slightly greater than that in the city as a whole. The effective control of trachoma in this area has so reduced the number of acute cases that it was necessary to secure patients from an adjoining district for the practical instruction of students. During the year, 2,600 suspects registered at the tuberculosis clinic; of these, 22 per cent proved tuberculous. The mortality from this disease is higher in Mokotów district than in the city of Warsaw as a whole.

Creditable work was accomplished in improving water-supplies and methods of sewage disposal. The housing situation continues acute, but home building is progressing more rapidly in Mokotów than in other districts of the city. The campaign against malaria was continued with the aid of the central health service and the State Institute of Hygiene in Warsaw. Anopheles breeding-places were removed and treatment was administered to malaria carriers.

Skierniewice District.—The cooperative demonstration in the district of Skierniewice, where efforts are being directed toward solving the health problems of an agricultural community,

has entered upon its fourth year. Interesting results have already been achieved at the four small village health centers, where local funds permit only the bare essentials for this work. Preventive work has centered about maternal, infant, and child hygiene and the special problems of tuberculosis and trachoma. In the town of Skierniewice the infant welfare station cared for 369 infants during the year. These babies received 1,385 medical examinations and 499 home visits. Eighty-seven expectant mothers were registered at the health center. More than half the children in the five elementary schools of the town were examined by the nurse. At the tuberculosis dispensary, 1,100 consultations were held during the year, and the nurses made 1,200 home visits to patients.

A public health pageant was organized in September to illustrate the activities of the demonstration. Attractive floats were prepared showing phases of infant welfare work, school hygiene, and nutrition work; many children of preschool age participated in the program.

Warsaw District.—In the district of Warsaw, where the cooperative demonstration is essentially one in rural health work, the program for developing health centers in villages was begun in 1926 and completed during 1928 by the installation of centers at Falenica and Wiazownia,

making a total of eleven centers for the district. With improved transportation facilities and a larger staff of adequately trained public health nurses, each center worked actively in the control of communicable diseases, in school hygiene, and public health education. At four centers, infant and maternal welfare stations have also been established.

After an epidemiological investigation of a typhoid epidemic in the village of Marki had disclosed the source of the outbreak, vigorous control measures were put into effect. The health centers provided care and advice for more than 1,000 tuberculosis patients; 2,500 persons with trachoma were examined and treatment was arranged for when necessary; more than 23,000 persons were vaccinated against scarlet fever, smallpox, and typhoid fever; and health examinations were given to 18,500 school children. The services of the mobile dental clinic were made available to 1,093 school children, who received a total of 1,300 dental treatments.

Improvement of the water-supplies of the district has been noteworthy: the number of good wells was increased during the year from about 12,000 to 14,300 and the number of unsatisfactory ones reduced from 4,300 to about 3,000. The demonstration area was visited frequently by district officials and health offi-

cers; it is considered to be a model, and many features of its program are applicable to other rural areas of Poland.

Yugoslavia

New Health Centers Established.—Following a public health survey of the provinces of Bosnia and Herzegovina in Western Yugoslavia in 1927 by a member of the Foundation's field staff, the government planned a program to strengthen the existing health organizations and to extend health service to rural areas. Foundation aid was given towards the cost of furnishings and equipment for five large health centers, which will serve the districts of Bihac, Banjaluka, Mostar, Travnik, and Plevlje, and will play a part in improving health conditions among a population of more than a million.

The health organization for the districts of Banjaluka and Bihac is supervised by the School of Public Health at Zagreb, while that for Mostar, Travnik, and Plevlje is administered from the Institute of Hygiene at Sarajevo. The five centers were completed before the close of 1928. Each will house the following services: a laboratory, a school health center, a mothers' and infants' consultation service, tuberculosis and venereal disease dispensaries, a dental clinic, public baths, and a public health exhibit. Two

of the centers are in the charge of former Foundation fellows.

Local Health Programs in the East

Ceylon

District Health Work Grows Steadily.—The Government of Ceylon has continued to extend its program of district health work. In addition to the two local health organizations already established in the Kalutara district in Western Province and in the Kurungala district in North Western Province, a third unit began to function in June 1928 in the Matara district in Southern Province which is entirely rural in character. Thus the benefits of modern health work were made available to urban and rural populations of approximately 140,000 persons in three of the nine provinces of the country. These organizations were supported entirely by the central and local governments; the Foundation provided only the services of its representative during part of the year.

Early in 1928 the administration of this work was placed under the direction of a Ceylonese medical officer of health, who has received special training through a government fellowship. Each of the three units is in the charge of a trained physician, and the staffs include public health nurses, midwives, and sanitary inspectors.

Their activities have aimed at improving sanitation, reducing communicable diseases, stimulating and extending public health education, and developing maternal, infant, and child welfare activities. It is planned to use the Kalutara district as a training base for medical officers of health, public health nurses, and sanitary inspectors. The government has approved two additional health units for 1929 for which local funds have already been voted, indicating that the health center idea is becoming firmly established in Ceylon.

China

Health Developments Continue.—The Foundation's representative in China continued as adviser to the public health station which was established in one section of the city of Peking in 1925 for the purpose of testing modern health practises under Chinese conditions and providing facilities for the practical field instruction of students. The program developed by the station during the past three years, has been an influence in the establishment of a municipal health department which was organized for the city of Peking in 1928 and is directed by a former Foundation fellow.

That the importance of public health is being increasingly recognized in China was shown by

the creation of a Ministry of Health in the nationalist government in October 1928. Foundation representatives have been able to be of service as consultants in public health to the national government at Nanking and to a number of municipal administrations including those of the cities of Peking, Shanghai, Hankow, Canton, and Tientsin. The commissioners of health at Peking and Shanghai are former fellows of the Foundation, while personnel at Tientsin were trained in China under its auspices. In 1928 the Foundation approved a program of cooperation with the Department of Health of the municipality of Greater Shanghai for a two-year period and voted funds for two demonstrations to be initiated in 1929, one in rural health work and the other in school hygiene.

India

Demonstrations in Sanitation in Madras Presidency.—In the Madras Presidency of India the newly organized bureau of sanitation of the Department of Public Health maintained the demonstration in village sanitation which has been carried on in the district of Madura since 1926. The methods employed have aroused interest in various parts of the presidency in programs for improving sanitary conditions. As a result, local funds have been provided for similar dem-

onstrations in the districts of Chingleput and Malabar; work was started in a village in the former district in April 1928.

Siam

Work Continues in Lopburi District.—As a result of recent government surveys in certain municipal areas in Siam, the program of health work undertaken by the Lopburi District Department of Health was modified during the past year. An improved system of collecting and analyzing vital statistics is being installed. A survey of housing conditions was begun, and plans for more effective disposal of night-soil were considered. Infant and maternal welfare activities were stressed; nearly 1,000 visits were made by the midwife-nurse to expectant mothers who were also benefited by more than 2,000 calls after the births of the infants. Sixty-one per cent of the mothers attended in childbirth had received prenatal care. The program of school hygiene was revised, and training in health habits was introduced in the schools. All pupils in government schools have now been vaccinated against smallpox and cholera.

South Pacific Islands

Unified Health Service Projected.—The anti-hookworm campaigns which have been carried

on in the South Pacific for a number of years with the aid of the Foundation, have created a widespread demand for improved health conditions. In order that this demand may be met the Foundation has entered upon a four-year cooperative agreement with the Western Pacific High Commission of the British Government to extend the training facilities of the Central Medical School for Native Medical Students at Suva, Fiji, and to develop a unified island health service under central control for the island groups administered by the commission. In 1928 the Western Pacific Health Service was organized; this functions as a department of the Western Pacific High Commission and is directed by a representative of the Foundation. A central office was established at Suva, Fiji.

Since yaws and hookworm disease represent outstanding health problems among native populations, the service will be concerned primarily with the reduction of these diseases by mass treatments. The graduates of the Central Medical School will be closely associated with this work. During 1928 field units of the health service began campaigns against yaws in Fiji and campaigns against both hookworm disease and yaws in the Gilbert and Ellice islands and the British Solomon islands. In 1929 work will be undertaken in the New Hebrides Condominium.

For the purpose of securing more reliable data on yaws incidence, upon which to base preventive measures, a complete yaws history of every person up to seventeen years of age was obtained in the course of a public health survey of the island of Rotumah, which has a typical South Pacific island population. According to the information obtained, practically one-half of the inhabitants between three and thirteen years of age have latent, secondary yaws, a situation which probably maintains the high incidence of the disease despite active treatment of clinical cases. It is believed that yaws may be reduced and perhaps eradicated by treating all persons up to the age of seventeen years, and all those beyond this age who show clinical symptoms of the disease. In the three island groups, 42,447 treatments for yaws were given to 17,020 persons in 1928. During the greater part of the year, the field units administered three doses of neoarsphenamine intravenously at weekly intervals; but experience has indicated that two doses will be adequate for secondary cases, and it is planned to give this number in the future.

Intensive educational work by means of lectures and demonstrations in the elements of disease prevention has been carried on. In Fiji a series of popular health articles along the general lines of those employed so successfully by

the Bureau of Health Education in Jamaica, was begun by a native medical practitioner in the monthly publication of the Department of Native Affairs.

Straits Settlements

Cooperative Rural Health Program Concluded.—One of the aims of the sanitation campaign which has been carried on during the past three years by the Government of the Straits Settlements with the aid of the Foundation, was the development of permanent rural health organizations which would continue measures for preventing hookworm disease and undertake other health activities. By creating district health centers at strategic points in the colony an effort was made to realize this objective, and when the cooperative agreement was concluded on December 31, 1928, two centers had been installed in Malacca, two in Singapore, one on the island of Penang, and one in Province Wellesley.

The chief activities of the health centers were communicable disease control, including anti-hookworm measures, and a program of infant and maternal welfare, which is being developed by the four trained public health nurses. The popular response to this work has been impressive; the records indicate that at the six centers during the past three years, 10,000 persons were

enrolled, 17,700 anthelmintic treatments were administered, and 5,300 specimens were examined for hookworm infection. The nursing staff made 27,000 home visits. An intensive program of health education was continued; baby shows were held, and 3,000 health talks were given which were attended by approximately 27,700 persons.

VIII

The Health Organization of the League of Nations

The Foundation continued collaboration with the Health Organization of the League of Nations by contributing towards two of its activities, namely, the interchanges of public health personnel and the development of a world-wide service of epidemiological intelligence and public health statistics.

During 1928 three interchanges were held, the first in India, the second in several countries of Europe, and the third in Italy. Grants were also made by the Health Organization for individual missions or special studies which were undertaken in Europe by four health experts representing England, Yugoslavia, and Japan.

Following the annual congress of the Far Eastern Association of Tropical Medicine in Calcutta, the second collective study tour to be held in the Far East was begun at Delhi on January 1

and was concluded at Bombay on February 18. The sixteen members of this interchange, who represented the health administrations of twelve Far Eastern governments, studied public health organization and practise in many parts of India, including Lahore, the Punjab, the United Provinces, Assam, Bengal, Bombay, Madras, and Mysore. Rural hygiene and measures for the prevention of malaria received special attention.

The first interchange to be organized solely for the study of rural hygiene was arranged for fourteen health officers and six sanitary engineers from eighteen countries. The group convened at Ljubljana, Yugoslavia, on May 17 and concluded the study tour on July 23. Visits were made to selected areas in Yugoslavia, Hungary, Germany, Netherlands, Belgium, and France in order to observe the activities conducted by governmental and private health organizations for the benefit of rural populations. A number of local health officials also participated in the programs provided for this interchange.

A general interchange, held in Italy from September 16 to November 8, consisted of twenty-one public health officials from sixteen countries. The participants, who met in Turin, made a comprehensive study tour of important centers in Italy and secured an understanding of some of the public health problems of that country.

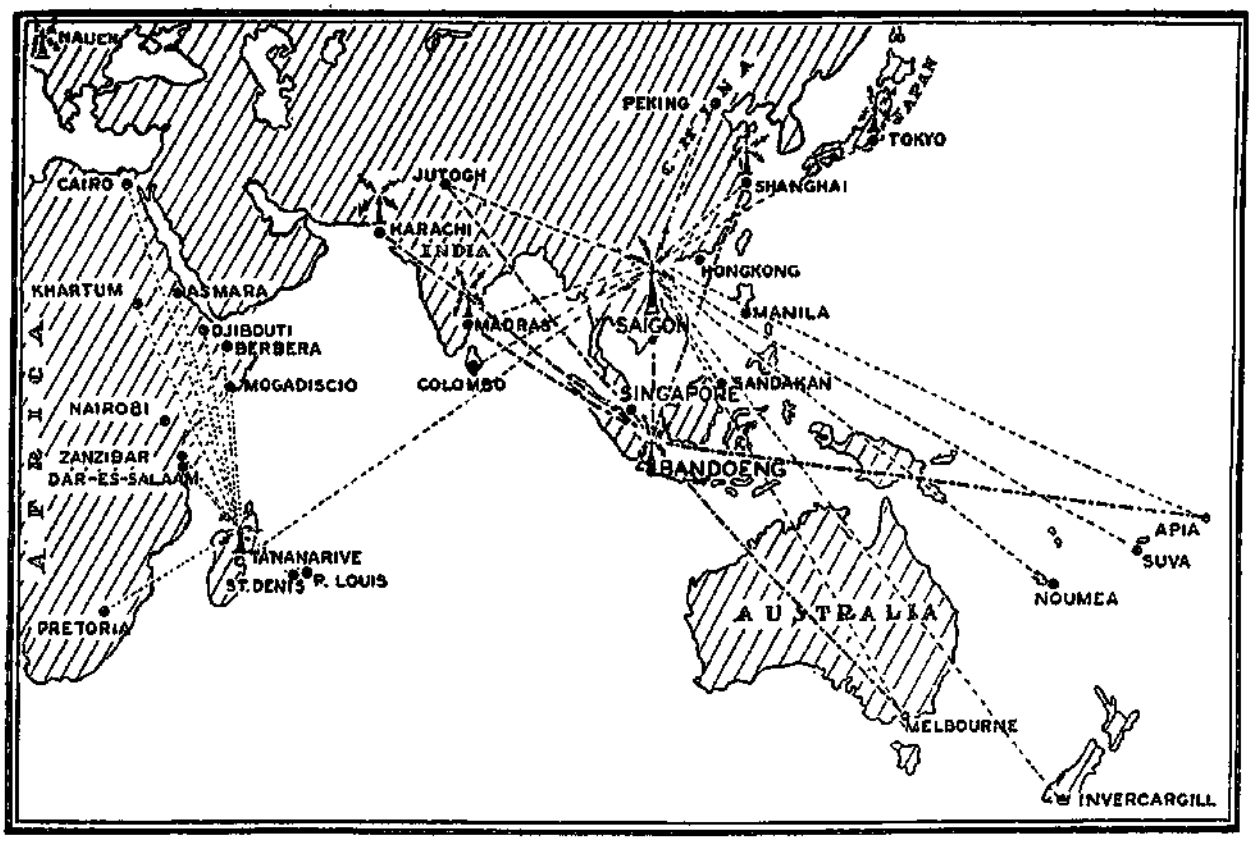
The present agreement of the Foundation relating to interchanges was terminated at the end of 1928. In order that the Health Organization might continue the interchange program, which is considered an effective means of strengthening relations between the health services of different governments and stimulating their progress, the Foundation approved a proposal to renew its financial assistance for an additional three-year period.

The service of epidemiological intelligence and public health statistics entered upon the first year of its work under a new seven-year cooperative agreement between the Health Organization and the Foundation for the furtherance of the activities of this service. Prompt notification to the central office at Geneva and to the regional bureau for the Far East at Singapore of the occurrence of important communicable diseases is becoming a routine procedure among an increasing number of health administrations in all parts of the world. The rapid transmission of such information by radio broadcasting, cable, telegraph, and post, to the countries directly interested, particularly to important ports, in order to prevent the spread of disease is the outstanding objective. (See map, page 265.) The work of the epidemiological service was further extended by the establishment of a re-

gional center for the Near East at Alexandria, Egypt, in May 1928, under the auspices of the Sanitary Maritime and Quarantine Council of Egypt.

The work accomplished by the service in the Far East through the Eastern Bureau at Singapore, which was established in 1925, has indicated that a distinct need in that area is being filled and that the bureau has come to be regarded as a permanent health agency which should be maintained as an integral part of an international health program. During the past year 143 Far Eastern ports sent weekly reports on health conditions to the bureau; encouraging progress was made in securing information from Chinese ports from which only meagre reports had been received previously. Nine governments in the Far East, namely, Egypt, the Federated Malay States, French Indo-China, Siam, China, Japan, the Netherlands East Indies, the Philippine Islands, and the Straits Settlements, fulfilled their pledges of support towards the maintenance of the bureau at Singapore during 1928.

The commission of expert statisticians which was appointed in 1926 continued its work of analyzing reports and observations offered by various governments relating to the forthcoming revision of the international list of causes of death, which will be considered during 1929. A beginning



Broadcasting and receiving stations used by the Far Eastern Bureau of the Health Organization of the League of Nations for securing and disseminating epidemiological information. The station at Nauen, Germany, broadcasts for the benefit of health administrations in Europe and in certain non-European countries.

was also made in the problem of attaining greater uniformity among nations in their morbidity statistics.

IX

Special Field Research

Acute Respiratory Diseases

The epidemiology of acute respiratory diseases has been studied in many parts of the world. Most of the observations have been made in densely populated areas where the groups studied were closely associated with a large number of other persons and subjected to a great variety of environmental factors affecting the flora of the respiratory tract. In an attempt to minimize these extraneous factors, the Foundation approved a program of field research in respiratory diseases to be conducted in cooperation with the Rockefeller Institute for Medical Research. It was planned to select as field-study areas isolated communities in which living conditions would be simple and contacts with the populations of other districts infrequent, and where the environmental factors could be more accurately determined and controlled than is possible in the average community.

The first field investigation, a study of the normal flora of the nasopharynx, was undertaken in a rather sparsely populated rural area of south-

Photograph Excised Here

Building at Northwest River which served as laboratory and headquarters for the staff conducting field studies of respiratory diseases in Labrador during the summer of 1928. The house was built by Lord Strathcona when, as a young man, he was stationed in Labrador as a representative of the Hudson Bay Company.

Photograph Excised Here

A few members of the group of nomadic Indians who visited Northwest River during July 1928 and were examined by the research staff.

Photograph Excised Here

Camp of the Indian visitors at Northwest River.

ern Alabama in October 1927 and was completed in April 1928. During this period the community suffered an epidemic of colds which was followed throughout its course by the investigators. In May 1928 the field laboratory staff, which consisted of an epidemiologist, a bacteriologist, and a technician, went to Northwest River, a Hudson Bay trading post located in the interior of Labrador. Studies were made of a group of fur trappers who live at the post and also, in July, of a number of nomadic Indians who leave their mountain homes once a year to trade at the settlement. An epidemic of acute respiratory disease developed during the studies, and its progress was closely observed by the investigators.

Oroya Fever and Verruga Peruana

The Foundation also collaborated with the Rockefeller Institute for Medical Research by making a field study to determine the mode of infection of Oroya fever (Carrion's disease) and verruga peruana, a disease which is endemic in certain districts in Peru at altitudes of 9,000 feet and over.

Experimental studies relating to this disease had been conducted at the institute for several years, and the causative organism had been established. Although the evidence implicated an in-

sect vector belonging to the genus phlebotomus, the exact mode of infection had not been completely determined. Upon the invitation of the Department of Health of Peru, a member of the Foundation field staff carried on an entomological investigation during 1928, chiefly in the verruga zones in the Rimac valley. About twenty-five species of blood-sucking insects, including three species of phlebotomus, were secured and sent to the institute, where transmission experiments with rhesus monkeys were conducted. The results of these tests have led to the conclusion that certain phlebotomi act as the insect vectors of Oroya fever and verruga peruana.

Table of Expenditures for Public Health Work for the Years

Activity, State, and Country	July 1, 1913–Dec. 31, 1921	1922	1923	1924
Grand Total	*$7,883,237.99*	*$9,071,719.05*	*$2,824,802.60*	*$2,887,783.83*
General Budget				
Hookworm Disease	3,046,051.33	498,582.94	415,138.41	460,674.93
County Health Work	181,296.40	214,854.79	230,829.08	236,507.33
Malaria Work	440,150.28	161,455.14	163,400.50	195,120.63
Yellow Fever Work	568,885.65	211,980.51	334,603.80	639,063.50
Tuberculosis Work in France	1,965,216.27	268,274.49	82,041.52	67,093.60
Public Health Education	246,478.45	140,598.40	200,701.38	253,843.25
Schools of hygiene and public health	111,205.37	20,561.52	7,604.19	30,167.35
Central Medical School for Native Medical Students, Suva, Fiji	.....	.....	.....	.....
Miscellaneous	129,273.08	120,036.88	193,097.19	223,675.90
State Health Services	16,109.70	74,688.55	109,888.92	97,976.79
Epidemiology	.....	.....	3,687.95	5,529.62
Sanitary engineering	.....	1,686.33	7,659.89	4,032.74
Vital statistics	.....	.....	400.00	1,706.66
Public health laboratory service	16,109.70	26,325.29	32,180.74	41,767.89
Public health nursing	.....	14,630.10	25,654.17	22,701.51
Other services	.....	32,046.83	40,306.17	22,238.37
Public Health Administration	33,445.12	20,554.47	106,660.89	169,120.60
Bureaus for study and reform of public health activities	33,445.12	5,534.47	7,720.00	17,720.00
Health organization of League of Nations	.....	15,020.00	98,940.89	151,400.60
Field Service Expenses not prorated to specific budgets	131,208.43	64,781.19	*247,734.39	121,101.32
Miscellaneous	287,721.65	15,605.53	11,065.32	10,171.07
Building, Equipment, and Endowment				
Schools and Institutes of Hygiene and Public Health	972,674.71	7,400,343.04	922,738.39	637,110.81
Schools of Nursing	.....	.....	.....	.....
Central Medical School for Native Medical Students, Suva, Fiji	.....	.....	.....	.....

* Includes initial deposit under retirement plan.

1913–1928, Inclusive, Covering All Activities

1925	1926	1927	1928	Total
$3,328,936.79	*$3,608,126.03*	*$3,795,673.90*	*$2,750,443.57*	*$36,150,723.76*
412,312.07	353,701.75	323,996.28	209,099.74	5,719,557.45
235,736.71	278,494.98	404,999.45	467,004.19	2,249,722.93
203,808.19	262,320.19	308,036.36	268,956.42	2,003,247.71
545,626.37	591,137.91	461,248.29	416,118.02	3,768,664.05
11,647.61	.....	.....	.....	2,394,273.49
301,052.09	372,804.69	403,163.44	352,896.32	2,265,538.02
27,073.94	24,968.20	26,214.38	11,383.27	259,178.22
.....	.....	.....	25,752.59	25,752.59
273,978.15	347,836.49	376,949.06	315,760.46	1,980,607.21
133,234.58	105,616.86	146,489.13	181,896.38	864,846.20
10,414.62	11,053.47	18,913.30	19,258.92	68,857.88
4,225.00	5,374.33	19,197.98	22,727.73	64,904.00
4,938.09	11,447.75	12,342.73	19,257.68	50,092.91
49,867.98	45,901.30	40,146.75	41,099.95	293,399.60
52,236.15	24,609.36	28,119.68	17,052.73	185,003.70
11,552.74	7,230.65	27,768.69	62,499.37	203,642.82
210,946.97	157,586.36	129,255.05	8,474.42	836,043.88
32,540.99	30,644.22	34,390.90	8,474.42	170,470.12
178,405.98	126,942.14	94,864.15	.....	665,573.76
157,662.13	183,319.68	75,402.51	114,459.35	1,095,669.00
9,905.54	10,418.44	19,666.32	46,523.26	411,077.13
1,107,004.53	1,262,514.32	1,414,262.06	685,015.45	14,401,663.31
.....	30,210.85	99,495.01	.....	129,705.86
.....	.....	9,660.00	.....	9,660.00

Table of Expenditures for Public Health Work for the Years

Activity, State, and Country	July 1, 1913–Dec. 31, 1921	1922	1923	1924
General Budget				
Hookworm Disease	*$3,046,051.33*	*$498,582.94*	*$415,138.41*	*$460,674.93*
United States *	*540,471.04*	*7,510.26*	*5,960.29*	*197.01*
Alabama	34,041.84	.....	25.00	.....
Arkansas	5,247.00	.....	.....	.....
Georgia	39,808.09	.....	.....	197.01
Kentucky	37,475.52	.....	.....	.....
Louisiana	6,309.34	.....	.....	.....
Mississippi	75,639.72	.....	.....	.....
North Carolina	55,020.97	.....	.....	.....
South Carolina	65,318.91	.....	.....	.....
Tennessee	54,649.32	.....	.....	.....
Texas	69,784.43	.....	.....	.....
Virginia	51,289.28	.....	.....	.....
Administration	25,359.31	.....	.....	.....
County dispensary work in the South	4,796.92	.....	.....	.....
Resurveys	15,730.39	7,510.26	5,935.29	.....
West Indies	*521,193.90*	*110,039.59*	*116,828.44*	*132,230.12*
Antigua	19,593.84	2,552.67	.....	.....
Barbados (survey)	1,651.31	.....	.....	.....
British Guiana †	89,052.88	248.37	.....	.....
Cayman Islands (survey)	1,795.16	.....	.....	.....
Dominica (survey)	.....	.....	89.32	2,659.78
Dutch Guiana †	52,592.13	17,786.64	19,416.68	.....
Grenada	37,364.32	.....	.....	.....
Haiti	.....	.....	.....	10,762.12
Jamaica	49,119.66	23,241.56	21,280.54	27,742.83
Montserrat-Nevis (survey)	.....	.....	.....	511.06
Porto Rico	26,114.21	28,450.98	30,395.06	36,417.62
Santa Domingo (survey)	1,077.07	.....	.....	.....
St. Kitts (survey)	.....	.....	1,989.24	2,624.67
St. Lucia	60,203.91	9,378.80	9,182.04	11,625.68
St. Vincent	31,761.76	.....	.....	.....
Tobago (survey)	1,072.22	.....	.....	.....
Trinidad	104,307.26	17,590.83	23,460.87	29,200.94
Administration	45,488.17	10,789.74	11,014.69	10,685.42
Central America	*666,887.67*	*86,922.83*	*90,714.46*	*81,299.80*
British Honduras (survey)	4,273.47	.....	.....	.....
Costa Rica	141,045.73	6,355.05	4,979.63	4,877.16
Guatemala	108,719.24	18,467.99	16,246.60	16,532.26

* In September, 1917, the hookworm work in the Southern States began to be absorbed into the longer in some states than in others, it was not possible to announce until the end of 1920 that in all responsibility for all efforts directed towards the relief and control of hookworm and other soil-borne

† For administrative reasons British and Dutch Guiana, although on the mainland of South America,

1913–1928, Inclusive, Covering All Activities—Continued

1925	1926	1927	1928	Total
$412,312.07	*$353,701.75*	*$323,996.28*	*$209,099.74*	*$5,719,557.45*
25.00	.....	.....	.....	*554.163.60*
25.00	.....	.....	.....	34,091.84
.....	.....	.....	.....	5,247.00
.....	.....	.....	.....	40,005.10
.....	.....	.....	.....	37,475.52
.....	.....	.....	.....	6,309.34
.....	.....	.....	.....	75,639.72
.....	.....	.....	.....	55,020.97
.....	.....	.....	.....	65,318.91
.....	.....	.....	.....	54,649.32
.....	.....	.....	.....	69,784.43
.....	.....	.....	.....	51,289.28
.....	.....	.....	.....	25,359.31
.....	.....	.....	.....	4,796.92
.....	.....	.....	.....	29,175.94
99,274.42	*49,211.72*	*40,542.18*	*34,887.72*	*1,104.208.09*
.....	.....	.....	.....	22,146.51
.....	.....	.....	.....	1,651.31
.....	.....	.....	.....	89,301.25
.....	.....	.....	.....	1,795.16
.....	.....	.....	.....	2,749.10
.....	.....	.....	.....	89,795.45
.....	.....	.....	.....	37,364.32
18,605.84	.....	.....	.....	29,367.96
36,056.49	26,983.36	19,397.92	12,461.97	216,284.33
173.28	.....	.....	.....	684.34
33,311.12	11,114.76	11,944.57	14,471.92	192,220.24
.....	.....	.....	.....	1,077.07
.....	.....	.....	.....	4,613.91
.....	.....	.....	.....	90,390.43
.....	.....	.....	.....	31,761.76
.....	.....	.....	.....	1,072.22
.....	.....	.....	.....	174,559.90
11,127.69	11,113.60	9,199.69	7,953.83	117,372.83
54,147.75	*36,652.93*	*38,274.13*	*28,346.94*	*1,083,246.51*
.....	.....	.....	.....	4,273.47
9,875.42	759.03	.....	.....	167,892.02
15,820.13	6,796.56	9,421.62	7,516.20	199,520.60

programs of the rapidly developing county departments of health. The period of transition being
the states the county health departments would henceforth assume, as one of their regular functions,
diseases.

are listed with the West Indies.

Table of Expenditures for Public Health Work for the Years

Activity, State, and Country	July 1, 1913–Dec. 31, 1921	1922	1923	1924
General Budget—*Cont'd*				
Hookworm Disease—*Continued*				
Central America—*Continued*				
Honduras	$.....	$10,802.41	$14,286.73	$12,902.91
Nicaragua	134,615.13	15,790.55	12,980.46	12,017.01
Panama	161,354.50	18,675.03	29,407.59	26,938.47
Salvador	85,239.63	8,283.79	5,271.68	.....
Administration	31,639.97	8,548.01	7,541.77	8,031.99
Mexico	.....	.....	.....	*36,284.08*
South America	*657,520.95*	*169,885.69*	*69,597.17*	*79,793.56*
Brazil	623,835.23	148,189.38	45,827.49	47,338.46
Colombia	33,685.72	21,696.31	22,217.48	16,241.47
Paraguay	.....	.....	1,552.20	16,213.63
Venezuela	.....	.....	.....	.....
Europe	.....	.....	.....	*4,012.42*
Spain	.....	.....	.....	4,012.42
The East	*626,117.94*	*116,718.54*	*101,717.15*	*104,950.55*
Uncinariasis Commission to Orient	51,483.31	.....	.....	.....
Australia	113,940.99	35,375.57	33,745.09	18,710.79
British North Borneo	10,546.33	5,641.00	3,101.75	.....
British Solomon Islands (survey)	1,378.85	225.60	.....	.....
Ceylon	180,006.84	15,041.57	9,252.78	7,520.64
China	28,570.03	.....	.....	.....
Egypt	26,074.78	.....	8,952.64	.....
Fiji Islands	15,241.77	10,653.55	7,431.02	7,282.03
India	20,306.30	9,883.53	10,275.40	8,307.39
Java	327.66	.....	.....	22,752.97
Mauritius	5,688.56	7,356.43	12,235.10	3,987.01
Sarawak	.....	.....	.....	.....
Seychelles Islands	32,956.03	.....	.....	.....
Siam	67,442.11	23,993.28	27,086.88	25,844.05
South Pacific Islands	.....	.....	.....	2,513.68
Straits Settlements	.....	.....	.....	.....
Administration	72,154.38	8,548.01	7,541.77	8,031.99
Miscellaneous	*33,859.83*	*7,506.03*	*30,320.90*	*21,907.39*
Field studies				
Alabama	.....	.....	14,524.06	4,869.46
Brazil	.....	1,006.35	220.96	.....

1913–1928, Inclusive, Covering All Activities—Continued

1925	1926	1927	1928	Total
$.....	$.....	$.....	$.....	$37,992.05
.....	.....	5,211.18	4,259.39	184,873.72
22,398.17	21,128.74	17,298.83	14,900.28	312,101.61
.....	.....	.....	.....	98,795.10
6,054.03	7,968.60	6,342.50	1,671.07	77,797.94
30,525.22	*24,457.28*	*15,442.82*	.....	*106,709.40*
78,048.90	*76,341.35*	*69,279.47*	*48,921.95*	*1,249,389.04*
24,134.26	.....	.....	.....	889,324.82
27,575.99	43,956.49	39,869.25	22,193.89	227,436.60
26,338.65	32,384.86	21,575.93	19,505.89	117,571.16
.....	.....	7,834.29	7,222.17	15,056.46
14,260.57	*1,500.88*	*3,847.88*	*3,155.86*	*26,777.61*
14,260.57	1,500.88	3,847.88	3,155.86	26,777.61
120,115.02	*132,275.93*	*119,696.84*	*60,348.11*	*1,381,940.08*
.....	.....	.....	.....	51,483.31
.....	.....	.....	.....	201,772.44
.....	.....	.....	.....	19,289.08
.....	.....	.....	.....	1,604.45
16,639.14	13,610.22	4,873.96	.....	246,945.15
.....	.....	.....	.....	28,570.03
.....	.....	.....	.....	17,122.14
201.37	6,571.49	.....	.....	47,381.23
20,140.47	15,647.83	21,085.22	15,083.91	120,730.05
21,446.09	22,031.82	21,710.60	.....	88,269.14
90.16	.....	.....	.....	29,176.94
.....	.....	10,083.19	.....	10,083.19
487.82	229.38	.....	.....	33,673.23
26,671.78	45,834.11	24,286.16	13,262.74	254,421.11
2,874.19	.....	10,062.68	.....	15,450.55
19,980.01	20,382.49	21,252.53	21,815.45	83,430.48
11,764.31	7,968.59	6,342.50	10,186.01	132,537.56
15,915.19	*33,261.66*	*36,912.96*	*33,439.16*	*213,123.12*
4,784.17	7,630.34	5,839.46	6,226.18	43,873.67
.....	.....	.....	.....	1,227.31

Table of Expenditures for Public Health Work for the Years

Activity, State, and Country	July 1, 1913–Dec. 31, 1921	1922	1923	1924
General Budget—*Cont'd*				
Hookworm Disease—*Continued*				
Miscellaneous—*Cont'd*				
Field studies—*Cont'd*				
Ceylon	$.....	$356.35	$85.09	$.....
Egypt	.....	.....	.....	.....
Research in life history of hookworm eggs and larvae	3,618.33	5,358.26	7,434.94	10,634.98
Thymol	15,476.21	.....	.....	.....
Research in carbon tetrachloride	.....	.....	9,455.85	5,852.36
Study of methods of diagnosing hookworm disease	543.95	758.57	.....	.....
Conferences of health officers	7,552.87	.....	.....	.....
Motion picture film on hookworm disease	4,402.47	.....	.....	34.66
Salvador				
Portable house and office	1,496.54	26.50	Cr.1,400.00	.....
Loss from earthquake	406.46	.....	.....	.....
Dutch Guiana, care and storage of motor boat	363.00	.....	.....	.....
Study of hookworm in the pig	.....	.....	.....	515.93
County Health Work	*$181,296.40*	*$214,854.79*	*$230,829.08*	*$236,507.33*
United States				
Alabama	18,231.35	21,915.97	19,966.46	10,580.09
Arkansas	.....	.....	.....	.....
California	.....	607.22	6,250.00	7,187.49
Colorado	.....	.....	.....	.....
Florida	237.75	772.08	.....	750.00
Georgia	4,338.17	2,790.68	1,537.72	1,588.63
Illinois	.....	1,927.94	1,849.99	1,725.00
Indiana	.....	1,641.66	2,250.00	.....
Iowa	.....	954.18	181.33	2,361.76
Kansas	10,810.99	13,095.38	7,349.13	6,648.29
Kentucky	16,316.41	16,057.84	16,802.48	15,631.73
Louisiana	5,618.28	15,397.64	14,184.73	10,984.34
Maryland	6,757.09	7,168.18	3,720.00	.....
Michigan	.....	.....	.....	.....
Minnesota	.....	.....	2,585.53	2,789.44

[a] Reports incomplete.

1913–1928, Inclusive, Covering All Activities—Continued

1925	1926	1927	1928	Total
$.....	$.....	$.....	$.....	$441.44
.....	.....	5,236.79	.....	5,236.79
9,231.02	21,234.26	7,876.34	7,152.85	72,540.98
.....	.....	.....	.....	15,476.21
1,900.00	4,288.57	17,928.96	19,996.02	59,421.76
.....	.....	.....	.....	1,302.52
.....	.....	.....	.....	7,552.87
.....	108.49	31.41	64.11	4,641.14
.....	.....	.....	.....	123.04
.....	.....	.....	.....	406.46
.....	.....	.....	.....	363.00
.....	.....	.....	.....	515.93
$235,736.71	*$278,494.98*	*$404,999.45*	*$467,004.19*	*$2,249,722.93*
6,111.06	8,276.84	5,969.07	*5,353.32	96,404.16
1,335.10	2,967.78	2,038.45	1,771.20	8,112.53
7,500.00	5,249.98	6,291.67	*5,833.33	38,919.69
1,875.00	2,500.00	2,000.00	2,000.00	8,375.00
.....	.....	.....	.....	1,759.83
1,518.08	3,447.57	3,961.03	5,924.57	25,106.45
1,650.00	750.00	.....	.....	7,902.93
.....	.....	.....	.....	3,891.66
1,625.90	3,600.00	3,100.00	3,300.00	15,123.17
2,908.36	3,747.28	2,525.00	2,343.76	49,428.19
11,321.01	11,710.60	11,892.48	*8,816.87	108,549.42
6,009.57	5,499.61	7,464.69	*6,820.55	71,979.41
.....	.....	.....	.....	17,645.27
.....	.....	.....	6,605.13	6,605.13
625.00	.....	.....	.....	5,999.97

Table of Expenditures for Public Health Work for the Years

Activity, State, and Country	July 1, 1913–Dec. 31, 1921	1922	1923	1924
General Budget—*Cont'd*				
County Health Work—*Continued*				
United States—*Continued*				
Mississippi	$15,652.72	$11,713.47	$20,238.91	$12,252.91
Missouri	600.00	9,391.41	9,575.00	7,350.00
Montana	.....	.....	.....	.....
New Mexico	10,837.52	8,510.73	6,879.86	11,240.19
North Carolina	15,370.42	7,169.78	9,041.86	10,836.22
Oklahoma	.....	.....	.....	3,283.96
Oregon	.....	4,441.17	6,138.42	8,116.42
South Carolina	17,651.97	12,302.18	13,929.78	13,489.00
South Dakota	.....	.....	.....	3,645.82
Tennessee	14,686.42	14,421.51	10,950.54	11,507.59
Texas	12,944.58	13,765.55	11,386.40	8,636.57
Utah	.....	.....	.....	1,066.83
Virginia	13,972.74	11,319.44	11,710.39	8,687.40
Washington	.....	.....	.....	2,500.00
West Virginia	7,071.29	5,089.15	8,223.28	8,606.13
Wyoming	.....	.....	399.75	2,462.51
Administration	10,198.70	12,887.71	14,316.45	18,918.77
Mississippi Flood Area				
Arkansas	.....	.....	.....	.....
Illinois	.....	.....	.....	.....
Kentucky	.....	.....	.....	.....
Louisiana	.....	.....	.....	.....
Mississippi	.....	.....	.....	.....
Missouri	.....	.....	.....	.....
Tennessee	.....	.....	.....	.....
Training Station	.....	.....	.....	.....
Administration, Flood Area	.....	.....	.....	.....
Foreign Countries				
Canada	.....	9,000.00	20,652.83	24,347.17
Europe				
Austria	.....	.....	.....	.....
Bulgaria	.....	.....	.....	.....
Czechoslovakia	.....	.....	.....	.....
France	.....	.....	.....	.....
Hungary	.....	.....	.....	.....
Poland	.....	.....	.....	.....
Yugoslavia	.....	.....	.....	.....
West Indies				
Porto Rico	.....	.....	.....	.....
Jamaica	.....	.....	.....	.....

* Reports incomplete.

1913–1928, Inclusive, Covering All Activities—Continued

1925	1926	1927	1928	Total
$11,081.99	$8,256.25	$13,389.00	*$7,286.50	$99,871.75
5,155.00	7,322.13	5,195.00	5,064.00	49,652.54
.....	.....	.....	1,283.34	1,283.34
6,516.00	5,691.68	3,179.07	2,795.26	55,650.31
8,981.33	7,500.00	5,000.00	.....	63,899.61
10,782.94	12,995.48	11,786.18	12,245.81	51,094.37
10,307.79	9,396.77	9,077.41	5,795.18	53,273.16
12,848.94	10,191.39	9,802.26	10,483.94	100,699.46
5,000.00	2,702.77	1,312.50	1,698.25	14,359.34
9,126.74	12,555.63	12,565.67	16,595.12	102,409.22
10,514.57	8,793.02	3,245.23	1,150.00	70,435.92
*2,553.75	*3,678.47	*2,500.00	*2,187.50	11,986.55
9,456.96	7,943.43	14,583.15	16,326.00	93,999.51
2,291.66	.....	.....	.....	4,791.66
9,719.05	9,819.24	15,258.61	16,374.38	80,161.13
2,498.63	922.54	856.80	*673.98	7,814.21
21,440.35	20,752.87	17,902.43	20,582.42	136,999.70
.....	.....	7,443.28	*37,186.11	44,629.39
.....	.....	.....	1,750.84	1,750.84
.....	.....	6,404.93	*9,000.44	15,405.37
.....	.....	6,623.11	*19,285.52	25,908.63
.....	.....	6,639.55	*8,793.71	15,433.26
.....	.....	1,354.86	*4,198.28	5,553.14
.....	.....	1,574.86	2,307.36	3,882.22
.....	.....	41,953.04	31,118.21	73,071.25
.....	.....	4,854.82	6,410.17	11,264.99
.....	6,875.36	15,199.57	27,516.40	103,591.33
2,823.85	4,678.31	4,136.98	3,631.88	15,271.02
.....	.....	1,503.83	*.....	1,503.83
.....	297.62	4,318.76	*9,560.78	14,177.16
3,441.75	18,657.19	24,486.47	*8,336.10	54,921.51
.....	498.52	500 00	*1,000.00	1,998.52
14,060.48	12,687.06	21,658.13	*7,245.26	55,650.93
.....	.....	14,000.00	20,000.00	34,000.00
.....	5,157.80	4,495.10	7,739.14	17,392.04
.....	.....	.....	1,332.86	1,332.86

Table of Expenditures for Public Health Work for the Years

Activity, State, and Country	July 1, 1913–Dec. 31, 1921	1922	1923	1924
General Budget—*Cont'd*				
County Health Work—*Continued*				
Foreign—*Continued*				
South America				
Brazil	$.....	$12,513.92	$10,708.24	$19,313.07
Mexico	.....	.....	.....	.....
The East				
Ceylon	.....	.....	.....	.....
Fiji	.....	.....	.....	.....
India	.....	.....	.....	.....
Philippine Islands	.....	.....	.....	.....
Siam	.....	.....	.....	.....
Administration	.....	.....	.....	.....
Malaria Work	*440,150.28*	*161,455.14*	*163,400.50*	*195,120.63*
Cooperative demonstrations	*390,098.08*	*94,015.02*	*79,280.50*	*107,528.50*
United States				
Alabama	16,556.98	15,416.93	8,232.07	5,936.26
Arkansas	45,461.54	6,388.11	4,274.13	4,263.40
California	.....	3,111.12	.....	.....
Florida	.....	.....	.....	1,125.00
Georgia	1,230.86	2,017.08	3,756.74	5,298.38
Illinois	.....	422.80	1,006.84	827.68
Louisiana	53,795.45	17,365.78	4,519.76	4,745.81
Mississippi	170,725.42	8,901.06	12,692.71	7,539.29
Missouri	1,471.37	2,900.00	3,200.00	3,000.00
North Carolina	25,942.38	9,046.96	9,292.94	15,644.96
South Carolina	27,264.64	10,892.31	7,556.95	7,196.81
Tennessee	3,482.50	3,659.65	1,963.50	5,516.22
Texas	21,819.57	2,307.84	5,213.64	5,007.00
Virginia	6,116.49	6,062.08	8,981.35	10,251.00
Administration United States	16,230.88	5,523.30	8,589.87	.....
Foreign Countries				
South America				
Argentina	.....	.....	.....	.....
Brazil	.....	.....	.....	31,176.69
Venezuela	.....	.....	.....	.....
Europe				
Bulgaria	.....	.....	.....	.....
Italy	.....	.....	.....	.....
Spain	.....	.....	.....	.....
Central America				
Panama	.....	.....	.....	.....
West Indies				
Porto Rico	.....	.....	.....	.....
Jamaica	.....	.....	.....	.....

* Reports incomplete.

1913–1928, Inclusive, Covering All Activities—Continued

1925	1926	1927	1928	Total
$29,240.11	$53,371.79	$47,600.51	$35,714.81	$208,462.45
.....	.....	.....	11,738.64	11,738.64
.....	.....	2,582.21	7,973.82	10,556.03
.....	.....	.....	9,047.90	9,047.90
.....	.....	.....	2,536.42	2,536.42
5,415.74	.....	50.02	.....	5,465.76
.....	.....	.....	3,011.26	3,011.26
.....	.....	16,723.72	21,257.87	37,981.59
203,808.19	***262,320.19***	***308,036.36***	***268,956.42***	***2,003,247.71***
109,579.79	***183,851.56***	***215,479.20***	***222,811.20***	***1,402,643.85***
5,239.56	6,306.38	7,540.95	.....	65,229.13
1,954.16	.....	.....	.....	62,341.34
.....	.....	.....	.....	3,111.12
.....	.....	.....	.....	1,125.00
3,634.40	2,841.52	2,755.04	5,443.28	26,977.30
3,214.92	.....	.....	.....	5,472.24
4,643.77	4,383.12	3,642.04	1,134.41	94,230.14
10,639.39	12,983.13	14,000.24	*6,150.00	243,631.24
1,911.67	1,367.75	.....	.....	13,850.79
7,401.41	4,404.42	*7,542.30	.....	79,275.37
9,035.86	9,700.00	10,800.00	5,800.00	88,246.57
4,541.63	5,978.95	4,108.34	1,500.00	30,750.79
1,151.09	.....	.....	.....	35,499.14
9,818.61	10,349.17	9,445.36	6,698.55	67,722.61
5,907.04	11,410.22	3,218.77	2,062.04	52,942.12
7,944.75	25,655.58	30,878.94	19,497.06	83,976.33
32,541.53	12,606.71	9,062.55	12,706.97	98,094.45
.....	.....	.....	4,508.08	4,508.08
.....	.....	.....	5,897.77	5,897.77
.....	62,952.88	89,675.64	91,318.31	243,946.83
.....	.....	.....	6,373.38	6,373.38
.....	.....	3,471.80	.....	3,471.80
.....	7,817.36	11,147.74	18,717.53	37,682.63
.....	.....	.....	9,904.49	9,904.49

Table of Expenditures for Public Health Work for the Years

ACTIVITY, STATE, AND COUNTRY	July 1, 1913–Dec. 31, 1921	1922	1923	1924
GENERAL BUDGET—*Cont'd*				
Malaria Work—				
Continued				
Cooperative demonstrations—*Cont'd*				
Foreign—*Cont'd*				
The East				
India	$.....	$.....	$.....	$.....
Palestine	.....	.....	.....	.....
Philippine Islands	.....	.....	.....	.....
Administration	.....	.....	.....	.....
Field studies and experiments	*47,996.85*	*67,440.12*	*77,977.71*	*80,530.36*
United States				
Alabama	.....	.....	.....	.....
Georgia	.....	.....	15,182.09	19,299.29
Louisiana	.....	.....	205.17	.....
Maryland	.....	.....	2,447.88	1,432.43
Mississippi	.....	.....	156.34	2,719.10
North Carolina	.....	.....	.....	.....
Foreign Countries				
Argentina	5,661.02	.....	.....	.....
Austria	.....	.....	.....	2,102.00
Brazil	292.05	22,043.09	20,429.27	.....
Ceylon	.....	.....	.....	.....
Ecuador	4,595.59	.....	.....	.....
India	.....	.....	.....	.....
Italy	.....	.....	127.24	15,243.89
Netherlands	.....	.....	.....	.....
Nicaragua	7,088.17	8,091.00	13,701.47	6,415.05
Palestine	.....	7,250.11	10,572.80	12,369.77
Philippine Islands	.....	6,077.50	8,623.03	14,748.52
Porto Rico	30,360.02	23,978.42	6,532.42	6,200.31
Spain	.....	.....	.....	.....
Venezuela	.....	.....	.....	.....
Training of personnel	.....	.....	.....	.....
France, Corsica	.....	.....	.....	.....
Italy	.....	.....	.....	.....
Miscellaneous	*2,055.35*	.....	*6,142.29*	*7,061.77*
Conference of malaria workers	2,055.35	.....	375.98	.....
Motion picture film	.....	.....	5,766.31	4,756.46
Studies at the Johns Hopkins School of Hygiene and Public Health	.....	.....	.....	2,004.56

* Reports incomplete.

1913–1928, Inclusive, Covering All Activities—Continued

1925	1926	1927	1928	Total
$.....	$.....	$.....	$3,154.37	$3,154.37
.....	.....	.....	6,428.65	6,428.65
.....	5,094.37	.....	.....	5,094.37
.....	.....	8,189.49	15,516.31	23,705.80
84,410.69	*65,929.43*	*80,267.93*	*35,688.15*	*540,241.24*
.....	.....	214.31	378.52	592.83
9,662.91	.....	23,031.17	.....	67,175.46
.....	.....	.....	.....	205.17
.....	.....	.....	.....	3,880.31
.....	.....	.....	.....	2,875.44
.....	26,079.53	.....	12,523.91	38,603.44
.....	.....	.....	.....	5,661.02
2,381.99	.....	.....	.....	4,483.99
.....	.....	.....	.....	42,764.41
.....	.....	4,548.41	.....	4,548.41
.....	.....	.....	.....	4,595.59
.....	.....	4,341.95	*.....	4,341.95
36,504.93	.....	.....	.....	51,876.06
.....	.....	5,092.20	6,867.23	11,959.43
7,335.47	4,215.02	.....	.....	46,846.18
4,756.34	3,384.48	6,727.54	.....	45,061.04
10,664.91	10,636.20	13,862.91	15,918.49	80,531.56
13,104.14	.....	.....	.....	80,175.31
.....	12,521.67	14,616.01	.....	27,137.68
.....	9,092.53	7,833.43	.....	16,925.96
3,363.52	5,280.38	5,267.94	5,536.58	19,448.42
3,363.52	5,280.38	5,267.94	106.77	14,018.61
.....	.....	.....	5,429.81	5,429.81
6,454.19	*7,258.82*	*7,021.29*	*4,920.49*	*40,914.20*
.....	.....	.....	.....	2,431.33
.....	.....	.....	.....	10,522.77
3,037.54	4,240.22	4,061.55	3,670.49	17,014.36

Table of Expenditures for Public Health Work for the Years

ACTIVITY, STATE, AND COUNTRY	July 1, 1913–Dec. 31, 1921	1922	1923	1924
GENERAL BUDGET—*Cont'd*				
Malaria Work—*Cont'd*				
Miscellaneous—*Cont'd*				
Studies at University of Chicago..	$.....	$.....	$.....	$.....
Entomological studies in the field....	.....	.....	.....	300.75
Yellow Fever Work.....	***568,885.65***	***211,980.51***	***334,603.80***	***639,063.50***
Yellow fever commissions.....	177,579.16	.....	239.97	.....
Brazil.....	461.30	469.68	107,856.91	515,421.42
Colombia and Venezuela †.....	.....	.....	42,000.47	62,252.23
Countries bordering on Caribbean littoral and Amazon Valley	4,514.26	.....	6,332.05	4,123.33
Ecuador.....	108,143.79	3,017.05	.....	.....
Mexico and Central America.....	197,851.51	163,219.91	159,031.85	40,922.22
Peru.....	80,335.63	36,041.68	.....	.....
Training of personnel.	.....	3,000.00	8,875.04	5,000.00
Vaccine and serum...	.....	6,000.00	3,786.06	6,000.00
History of yellow fever	.....	232.19	6,481.45	5,344.30
West Africa.....	.....	.....	.....	.....
Tuberculosis work in France.....	***1,965,216.27***	***268,274.49***	***82,041.52***	***67,093.60***
Inauguration of work.	18,671.74	.....	.....	.....
Departmental organization.....	186,646.04	24,044.27	.....	.....
Public health visiting.	177,664.54	99,525.30	54,759.09	37,371.65
Educational division..	447,885.46	62,422.55	.....	.....
Medical division.....	786,989.01	.....	.....	.....
Contingent fund.....	750.00	2,490.94	4,766.70	4,420.94
Postgraduate tuberculosis courses.....	.....	5,044.15	.....	.....
National Committee..	.....	.....	22,515.73	10,472.28
Central administration	346,609.48	74,747.28	.....	14,828.73
Public Health Education	***240,478.45***	***140,598.40***	***200,701.38***	***253,843.25***
Schools of hygiene and public health				
Maintenance.....	*111,205.37*	*20,561.52*	*7,604.19*	*30,167.35*
Brazil, São Paulo	111,205.37	20,561.52	5,404.19	7,613.95
England, London	.....	.....	.....	15,953.40
Hungary, Budapest.....	.....	.....	.....	.....
Poland, Warsaw.	.....	.....	2,200.00	6,600.00

* Reports incomplete.
† The cost of work in Venezuela includes only the expenses of the Survey Commission.

1913–1928, Inclusive, Covering All Activities—Continued

1925	1926	1927	1928	Total
$772.81	$1,725.00	$2,496.88	$1,250.00	$6,244.69
2,643.84	1,293.60	462.86	.....	4,701.05
545,626.37	***591,137.91***	***461,248.29***	***416,118.02***	***3,768,664.05***
.....	.....	.....	.....	177,819.13
370,391.59	444,068.97	205,825.73	159,855.50	1,804,351.10
9,723.35	.....	.....	.....	113,976.05
.....	.....	.....	.....	14,969.64
.....	.....	.....	.....	111,160.84
52,767.26	10,305.04	.....	.....	624,097.79
.....	.....	.....	.....	116,377.31
9,256.76	4,147.93	9,389.98	23,494.30	63,164.01
6,000.00	5,867.94	5,142.89	2,141.08	34,937.97
3,941.33	2,250.00	2,326.60	2,005.00	22,580.87
93,546.08	124,498.03	238,563.09	228,622.14	685,229.34
11,647.61	.....	.....	.....	***2,394,273.49***
.....	.....	.....	.....	18,671.74
.....	.....	.....	.....	210,690.31
.....	.....	.....	.....	369,320.58
.....	.....	.....	.....	510,308.01
.....	.....	.....	.....	786,989.01
.....	.....	.....	.....	12,428.58
.....	.....	.....	.....	5,044.15
11,647.61	.....	.....	.....	44,635.62
.....	.....	.....	.....	436,185.49
301,052.09	***372,804.69***	***403,163.44***	***352,896.32***	***2,265,538.02***
27,073.94	*24,968.20*	*26,214.38*	**11,383.27*	*259,178.22*
4,065.22	25.95	.....	.....	148,876.20
20,008.72	20,262.25	19,414.38	11,383.27	87,022.02
.....	.....	3,680.00	.....	3,680.00
3,000.00	4,680.00	3,120.00	.....	19,600.00

Table of Expenditures for Public Health Work for the Years

Activity, State, and Country	July 1, 1913–Dec. 31, 1921	1922	1923	1924
General Budget—*Cont'd*				
Public Health Education —*Continued*				
Central Medical School for Native Medical Students, Suva, Fiji	$.....	$.....	$.....	$.....
Miscellaneous	*129,273.08*	*120,036.88*	*193,097.19*	*223,675.90*
Fellowships	115,550.27	114,637.24	186,519.93	182,427.80
Training of health workers	13,688.12	5,399.64	6,577.26	36,088.04
Training bases				
Alabama	.....	.....	.....	5,160.06
Ohio	.....	.....	.....	.....
Teaching of hygiene in medical schools				
Harvard Medical School	.....	.....	.....	.....
Rio de Janeiro Faculty of Medicine	.....	.....	.....	.....
Study of teaching hygiene and public health in medical schools	34.69	.....	.....	.....
State Health Services	*16,109.70*	*74,688.55*	*109,888.92*	*97,976.79*
Epidemiology	.....	.....	*3,687.95*	*5,529.62*
United States				
Alabama	.....	.....	.....	2,229.04
Georgia	.....	.....	.....	.....
Kansas	.....	.....	.....	.....
Kentucky	.....	.....	.....	.....
Louisiana	.....	.....	.....	.....
Mississippi	.....	.....	.....	.....
Montana	.....	.....	.....	.....
North Carolina	.....	.....	.....	.....
North Dakota	.....	.....	.....	.....
Rhode Island	.....	.....	.....	.....
South Carolina	.....	.....	.....	.....
South Dakota	.....	.....	.....	.....
Tennessee	.....	.....	.....	.....
Utah	.....	.....	151.14	2,550.58
Virginia	.....	.....	3,536.81	750.00
Conference of epidemiologists	.....	.....	.....	.....
Foreign Countries				
Denmark	.....	.....	.....	.....
Spain	.....	.....	.....	.....

* Reports incomplete.

1913–1928, Inclusive, Covering All Activities—Continued

1925	1926	1927	1928	Total
$.....	$.....	$.....	$25,752.59	$25,752.59
273,978.15	*347,836.49*	*376,949.06*	*315,760.46*	*1,980,607.21*
230,028.32	270,174.77	267,981.60	218,740.70	1,586,060.63
25,469.45	48,661.21	87,765.00	74,245.16	297,893.88
18,480.38	11,585.62	6,024.80	11,795.11	53,045.97
.....	.....	6,677.66	10,979.49	17,657.15
.....	5,500.00	8,500.00	*.....	14,000.00
.....	11,914.89	.....	.....	11,914.89
.....	.....	.....	.....	34.69
133,234.58	*105,616.86*	*146,489.13*	*181,896.38*	*865,900.91*
10,414.62	*11,053.47*	*18,913.30*	*19,258.92*	*68,857.88*
5,049.68	2,277.26	3,977.77	.....	13,533.75
.....	.....	.....	*.....	.....
236.62	406.72	228.96	.....	872.30
.....	.....	.....	1,788.28	1,788.28
.....	.....	1,930.25	.....	1,930.25
.....	1,819.08	3,337.50	*1,490.92	6,647.50
.....	.....	.....	2,625.00	2,625.00
.....	.....	.....	*.....	.....
.....	.....	.....	1,108.74	1,108.74
537.68	1,653.79	854.58	.....	3,046.05
.....	193.75	775.00	3,175.00	4,143.75
.....	1,142.32	1,275.00	.....	2,417.32
924.33	2,701.05	2,453.23	2,250.00	8,328.61
2,735.35	859.50	600.00	1,943.71	8,840.28
930.96	.....	.....	.....	5,217.77
.....	.....	1,340.49	.....	1,340.49
.....	.....	2,140.52	4,877.27	7,017.79
.....	.....	.....	*.....	.....

Table of Expenditures for Public Health Work for the Years

Activity, State, and Country	July 1, 1913–Dec. 31, 1921	1922	1923	1924
General Budget—*Cont'd*				
State Health Services—*Continued*				
Sanitary engineering	.....	*$1,686.33*	*7,659.89*	*$4,032.74*
United States				
Alabama	.....	.....	.....	.....
Colorado	.....	.....	.....	1,200.00
Connecticut	.....	.....	.....	.....
Idaho	.....	.....	.....	.....
Indiana	.....	.....	.....	.....
Iowa	.....	.....	3,495.12	.....
Louisiana	.....	.....	457.72	.....
Maine	.....	.....	.....	.....
Missouri	.....	1,050.00	368.43	.....
Montana	.....	.....	927.57	1,855.01
North Dakota	.....	.....	.....	477.73
Oregon	.....	.....	.....	.....
South Carolina	.....	.....	.....	.....
Tennessee	.....	.....	642.55	.....
Texas	.....	.....	1,423.50	.....
Utah	.....	636.33	345.00	500.00
Field Research in bored-hole latrine	.....	.....	.....	.....
Foreign Countries				
Ceylon	.....	.....	.....	.....
Costa Rica	.....	.....	.....	.....
Panama	.....	.....	.....	.....
Venezuela	.....	.....	.....	.....
Vital statistics	.....	.....	*400.00*	*1,706.66*
United States				
Alabama	.....	.....	.....	.....
Arkansas	.....	.....	.....	.....
Georgia	.....	.....	400.00	.....
Iowa	.....	.....	.....	.....
Mississippi	.....	.....	.....	.....
Montana	.....	.....	.....	.....
New Mexico	.....	.....	.....	.....
Oklahoma	.....	.....	.....	.....
South Carolina	.....	.....	.....	.....
Tennessee	.....	.....	.....	.....
Texas	.....	.....	.....	.....
West Virginia	.....	.....	.....	1,706.66
Foreign Countries				
Bulgaria	.....	.....	.....	.....
Colombia	.....	.....	.....	.....
Denmark	.....	.....	.....	.....
Yugoslavia	.....	.....	.....	.....

* Reports incomplete.

1913–1928, Inclusive, Covering All Activities—Continued

1925	1926	1927	1928	Total
$4,225.00	*$5,374.33*	*$19,197.98*	*$22,727.73*	*$64,904.00*
.....	1,447.85	1,334.12	.....	2,781.97
800.00	.....	.....	.....	2,000.00
375.00	.....	.....	.....	375.00
1,600.00	1,578.67	1,600.00	1,599.89	6,378.56
.....	.....	.....	2,756.15	2,756.15
.....	58.33	349.98	.....	3,903.43
.....	.....	.....	.....	457.72
350.00	700.00	350.00	.....	1,400.00
.....	.....	.....	.....	1,418.43
950.00	.....	.....	.....	3,732.58
.....	.....	.....	536.02	1,013.75
.....	1,214.30	733.10	.....	1,947.40
.....	.....	.....	3,350.00	3,350.00
.....	375.18	1,143.33	.....	2,161.06
.....	.....	.....	.....	1,423.50
150.00	.....	.....	.....	1,631.33
.....	.....	.....	405.01	405.01
.....	.....	2,564.60	7,096.56	9,661.16
.....	.....	.....	3,492.05	3,492.05
.....	.....	3,471.79	3,492.05	6,963.84
.....	.....	7,651.06	.....	7,651.06
4,938.09	*11,447.75*	*12,342.73*	*19,257.68*	*50,092.91*
665.00	847.50	990.00	.....	2,502.50
.....	1,350.00	750.00	.....	2,100.00
.....	.....	.....	1,200.00	1,600.00
.....	2,100.00	1,500.00	.....	3,600.00
700.00	882.38	2,204.97	902.73	4,690.08
1,250.00	2,500.00	1,250.00	.....	5,000.00
.....	.....	.....	600.00	600.00
.....	686.68	*.....	.....	686.68
.....	.....	290.00	1,250.00	1,540.00
1,273.09	1,500.00	1,750.00	1,000.00	5,523.09
.....	.....	.....	2,703.43	2,703.43
1,050.00	.....	.....	.....	2,756.66
.....	.....	1,139.50	.....	1,139.50
.....	.....	863.67	.....	863.67
.....	1,581.19	1,604.59	1,608.31	4,794.09
.....	.....	.....	*9,993.21	9,993.21

Table of Expenditures for Public Health Work for the Years

Activity, State, and Country	July 1, 1913–Dec. 31, 1921	1922	1923	1924
General Budget—*Cont'd*				
State Health Services—*Continued*				
Public health laboratory service	*$16,109.70*	*$26,325.29*	*$32,180.74*	*$41,767.89*
United States				
Alabama	.....	3,261.03	9,973.47	12,560.85
Arkansas	.....	.....	1,676.16	3,836.39
Connecticut	.....	.....	.....	375.00
Delaware	.....	.....	.....	1,500.00
Kansas	2,539.88	5,468.14	2,693.88	.....
Louisiana	.....	.....	.....	.....
Maine	.....	.....	.....	.....
Missouri	.....	874.99	.....	2,067.41
Montana	.....	.....	676.74	2,100.00
Oklahoma	.....	.....	.....	.....
Oregon	.....	.....	900.00	2,688.37
South Carolina	.....	.....	.....	.....
Tennessee	.....	250.00	2,888.45	2,166.66
Texas	.....	.....	.....	.....
Utah	.....	.....	.....	1,900.00
Virginia	.....	.....	899.51	1,053.96
Foreign Countries				
Colombia	.....	.....	.....	.....
Costa Rica	.....	.....	303.14	2,994.39
Guatemala	307.50	621.75	1,581.36	1,715.94
Honduras	.....	.....	4,222.71	.....
Nicaragua	85.18	2,445.53	3,271.69	6,808.92
Philippine Islands	.....	.....	.....	.....
Salvador	984.34	1,028.72	3,093.63	.....
Demonstrations	.....	206.33	.....	.....
Administration	12,192.80	12,168.80	.....	.....
Public health nursing	.....	*14,630.10*	*25,654.17*	*22,701.51*
Brazil	.....	.....	.....	.....
Service of nursing	.....	14,630.10	25,654.17	22,701.51
France	.....	.....	.....	.....
Poland	.....	.....	.....	.....
Other services	.....	*$32,046.83*	*$40,306.17*	*$22,238.37*
Foreign Countries				
Australia	.....	20,000.00	21,432.73	9,715.68
Bulgaria	.....	.....	.....	.....
Canada	.....	.....	.....	577.93
Honduras	.....	.....	.....	.....
Hungary	.....	.....	.....	.....

* Reports incomplete.

1913–1928, Inclusive, Covering All Activities—Continued

1925	1926	1927	1928	Total
$49,867.98	*$45,901.30*	*$40,146.75*	*$41,099.95*	*$293,399.60*
7,479.00	7,494.53	5,403.75	.....	46,172.63
1,195.41	.....	.....	.....	6,707.96
1,800.00	.....	.....	.....	2,175.00
.....	.....	.....	.....	1,500.00
.....	.....	.....	.....	10,701.90
.....	.....	.....	444.43	444.43
600.00	1,300.00	780.00	.....	2,680.00
1,771.48	2,049.17	3,600.00	*3,600.00	13,963.05
1,050.00	.....	.....	.....	3,826.74
.....	.....	.....	*.....	.....
1,120.32	340.98	.....	.....	5,049.67
498.92	300.00	.....	1,000.00	1,798.92
2,301.16	938.13	985.00	1,754.36	11,283.76
70.83	2,789.82	2,992.40	650.00	6,503.05
2,775.00	2,868.92	.....	*.....	7,543.92
995.53	249.65	.....	*.....	3,198.65
.....	410.50	4,896.99	7,357.68	12,665.17
3,636.12	2,757.05	194.81	.....	9,885.51
1,546.64	3,894.27	3,835.45	9,391.10	22,894.01
.....	.....	.....	.....	4,222.71
12,882.86	12,616.35	9,492.35	9,748.87	57,351.75
.....	.....	7,966.00	7,153.51	15,119.51
.....	.....	.....	.....	5,106.69
.....	.....	.....	.....	206.33
10,144.71	7,891.93	.....	.....	42,398.24
52,236.15	*24,609.36*	*28,119.68*	*17,052.73*	*185,003.70*
.....	.....	.....	.....	.....
26,497.42	21,010.29	24,557.62	17,052.73	152,103.84
25,738.73	3,599.07	3,562.06	*.....	32,899.86
.....	.....	.....	*.....	*.....
$11,552.74	*$7,230.65*	*$27,768.69*	*$62,499.37*	*$203,642.82*
.....	.....	.....	.....	51,148.41
.....	.....	.....	605.06	605.06
.....	.....	.....	.....	577.93
5,740.85	6,876.19	.....	.....	12,617.04
.....	.....	.....	*5,701.01	5,701.01

Table of Expenditures for Public Health Work for the Years

Activity, State, and Country	July 1, 1913–Dec. 31, 1921	1922	1923	1924
General Budget—*Cont'd*				
State Health Services—*Continued*				
Other Services—*Continued*				
Jamaica	$.....	$.....	$.....	$.....
Netherlands East Indies	.....	.....	.....	.....
Philippine Islands	.....	12,046.83	18,873.44	11,944.76
United States				
Illinois	.....	.....	.....	.....
Iowa	.....	.....	.....	.....
South Carolina	.....	.....	.....	.....
Administration				
State health services	.....	.....	.....	.....
Public Health Administration				
Bureaus for study and reform of public health activities	*33,445.12*	*5,534.47*	*7,720.00*	*17,720.00*
Czechoslovakia	33,445.12	5,534.47	7,720.00	12,720.00
France	.....	.....	.....	5,000.00
Hungary	.....	.....	.....	.....
Poland	.....	.....	.....	.....
Health Organization of League of Nations	.....	*15,020.00*	*98,940.89*	*151,400.60*
Interchange of public health personnel	.....	15,020.00	63,080.00	91,353.22
Epidemiological Intelligence Service	.....	.....	29,215.44	32,808.37
Epidemiological Intelligence Bureau, Far East	.....	.....	.....	.....
Training in vital statistics	.....	.....	6,645.45	20,700.54
Expenses of Dr. W. H. Welch	.....	.....	.....	3,087.38
Conference in Singapore	.....	.....	.....	3,451.09
Miscellaneous	*$287,721.65*	*$15,605.53*	*$11,065.32*	*$10,171.07*
Surveys and exhibits	129,006.46	.....	.....	.....
Library	1,844.12	.....	.....	.....

* Reports incomplete.

1913–1928, Inclusive, Covering All Activities—Continued

1925	1926	1927	1928	Total
$.....	$354.46	$554.41	$1,397.51	$2,306.38
.....	.....	.....	22,239.26	22,239.26
5,811.89	.....	.....	.....	48,676.92
.....	.....	100.00	236.67	336.67
.....	.....	800.00	1,600.00	2,400.00
.....	.....	.....	1,100.00	1,100.00
.....	.....	26,314.28	29,619.86	55,934.14
32,540.99	*30,644.22*	*34,390.90*	*8,474.42*	*170,470.12*
7,720.00	7,720.00	7,594.47	.....	82,454.06
13,638.69	10,614.56	12,212.76	*.....	41,466.01
4,987.67	5,000.00	4,991.74	4,993.83	19,973.24
6,194.63	7,309.66	9,591.93	3,480.59	26,576.81
178,405.98	*126,942.14*	*94,864.15*	*.....	*665,573.76*
99,176.33	73,484.58	49,817.98	*.....	391,932.11
32,532.70	20,229.96	27,237.18	*.....	142,023.65
26,802.27	12,647.13	15.00	*.....	39,464.40
19,894.68	20,580.47	17,793.99	*.....	85,615.13
.....	.....	.....	.....	3,087.38
.....	.....	.....	.....	3,451.09
$9,905.54	*$10,418.44*	*$19,666.32*	*$46,523.26*	*$411,077.13*
.....	.....	.....	.....	129,006.46
.....	.....	.....	.....	1,844.12

Table of Expenditures for Public Health Work for the Years

Activity, State, and Country	July 1, 1913–Dec. 31, 1921	1922	1923	1924
General Budget—*Cont'd*				
Miscellaneous—*Cont'd*				
Philippine Hospital Ship	$37,500.00	$.....	$.....	$.....
Investigation of sewage disposal in rural homes	11,090.11	.....	.....	.....
Medical Commission to Brazil	18,513.47	.....	.....	.....
Adviser in medical education	14,391.86	.....	.....	.....
Investigation of powdered milk	500.00	.....	.....	.....
Paris conference on International Nomenclature of Causes of Death	615.30	.....	.....	.....
Compilation of Mining Sanitary Code	125.98	77.20	.....	.....
Smallpox vaccine for Vera Cruz, Mexico	.....	.....	165.62	.....
Plans for laboratory at Nictheroy, Brazil	.....	.....	429.98	.....
Field equipment and supplies	40,621.71	5,189.62	6,688.08	6,949.08
Pamphlets, charts, and films	27,726.68	8,869.43	3,057.48	2,389.95
Hookworm and malaria films donated or lent	.....	.....	.....	.....
Express, freight, and exchange	5,785.96	1,469.28	724.16	832.04
Field research in respiratory diseases	.....	.....	.....	.....
Tuberculosis study clinic, Kingston	.....	.....	.....	.....
Studies in verruga peruana	.....	.....	.....	.....
Buildings, Equipment and Endowment				
Schools and Institutes of Hygiene and Public Health	*972,674.71*	*7,400,343.04*	*922,738.39*	*637,110.81*
Brazil				
Bahia	.....	.....	.....	.....
São Paulo	.....	.....	.....	.....
Canada. Toronto	.....	.....	.....	.....

1913–1928, Inclusive, Covering All Activities—Continued

1925	1926	1927	1928	Total
$.....	$.....	$.....	$.....	$37,500.00
.....	.....	.....	.....	11,090.11
.....	.....	.....	.....	18,513.47
.....	.....	.....	.....	14,391.86
.....	.....	.....	.....	500.00
.....	.....	.....	.....	615.30
.....	.....	.....	.....	203.18
.....	.....	.....	.....	165.62
.....	.....	.....	.....	429.98
6,689.78	5,302.81	12,890.35	14,715.53	99,046.96
2,884.85	6,290.94	1,406.92	4,053.97	56,680.22
40.00	99.12	429.90	Cr. 62.57	506.45
290.91	Cr. 1,274.43	408.35	575.44	8,811.71
.....	.....	4,530.80	13,971.21	18,502.01
.....	.....	.....	6,361.26	6,361.26
.....	.....	.....	6,908.42	6,908.42
1,107,004.53	*1,262,514.32*	*1,414,262.06*	*685,015.45*	*14,401,663.31*
3,595.40	.....	.....	.....	3,595.40
.....	46,900.00	23,987.00	117,264.88	188,151.88
262,500.00	162,500.00	12,500.00	250,000.00	687,500.00

Table of Expenditures for Public Health Work for the Years

Activity, State, and Country	July 1, 1913–Dec. 31, 1921	1922	1923	1924
Buildings, Equipment, and Endowment—*Continued*				
Schools and Institutes of Hygiene and Public Health—*Continued*				
Czechoslovakia. Prague	$204.51	$3,416.41	$4,964.84	$9,610.81
Denmark. Copenhagen	.....	.....	.....	.....
England. London	.....	22,774.78	209,023.55	.....
Hungary. Budapest	.....	.....	.....	.....
Norway. Oslo	.....	.....	.....	.....
Poland. Warsaw	.....	.....	90,000.00	202,500.00
Trinidad	.....	.....	.....	.....
Turkey	.....	.....	.....	.....
United States				
Harvard University	41,500.00	1,209,034.25	618,750.00	425,000.00
The Johns Hopkins University	930,970.20	6,165,117.60	.....	.....
Yugoslavia	.....	.....	.....	.....
Belgrade	.....	.....	.....	.....
Zagreb	.....	.....	.....	.....
D. Anna Nery School of Nursing, Brazil	.....	.....	.....	.....
Central Medical School for Native Medical Students, Suva, Fiji	.....	.....	.....	.....

1913–1928, Inclusive, Covering All Activities—Continued

1925	1926	1927	1928	Totals
$202,886.77	$160,475.99	$95,054.50	$189,212.08	$665,825.91
198,833.61	.....	.....	.....	198,833.61
205,000.00	689,628.33	969,783.48	.....	2,096,210.14
40,000.00	.....	60,297.54	43,648.49	143,946.03
.....	86,050.00	100,626.54	.....	186,676.54
.....	.....	.....	.....	292,500.00
4,851.25	4,885.00	4,872.00	4,890.00	19,498.25
.....	.....	.....	80,000.00	80,000.00
31,250.00	25,000.00	137,250.00	.....	2,487,784.25
.....	.....	.....	.....	7,096,087.80
.....	.....	.....	.....	.....
33,950.00	.....	.....	.....	33,950.00
124,137.50	87,075.00	9,891.00	.....	221,103.50
.....	30,210.85	99,495.01	.....	129,705.86
.....	.....	9,660.00	.....	9,660.00

STAFF OF THE INTERNATIONAL HEALTH DIVISION DURING 1928

Frederick F. Russell, M.D., *Director*

Associate Directors

John A. Ferrell, M.D.
Victor G. Heiser, M.D.
Hector H. Howard, M.D.
Wilbur A. Sawyer, M.D.

Assistant Directors

Lewis W. Hackett, M.D.
George K. Strode, M.D.

Field Directors

Charles A. Bailey, M.D.
Marshall C. Balfour, M.D.
Milford E. Barnes, M.D.
Henry Beeuwkes, M.D.
George Bevier, M.D.
Mark F. Boyd, M.D.
Earl LeR. Burky, M.D.
Fred C. Caldwell, M.D.
Paul S. Carley, M.D.
Henry P. Carr, M.D.
Ralph K. Collins, M.D.
Michael E. Connor, M.D.
Platt W. Covington, M.D.
Porter J. Crawford, M.D.
Nelson C. Davis, M.D.
Walter C. Earle, M.D.
John E. Elmendorf, Jr., M.D.
John B. Grant, M.D.
Walter C. Hausheer, M.D.[1]
Rolla B. Hill, M.D.
N. Paul Hudson, M.D.
John L. Hydrick, M.D.
William P. Jacocks, M.D.
John H. Janney, M.D.
John F. Kendrick, M.D.
J. Austin Kerr, M.D.
Sylvester M. Lambert, M.D.
Charles N. Leach, M.D.
William A. McIntosh, M.D.
Earl B. McKinley, M.D.[1]
Alexander F. Mahaffy, M.D.
Frank Milam, M.D.
W. Leland Mitchell, M.D.
Daniel M. Molloy, M.D.
Clarence F. Moriarty, M.D.[1]
Hugo Muench, M.D.
George C. Payne, M.D.
Elsmere R. Rickard, M.D.
Paul F. Russell, M.D.
Louis Schapiro, M.D.
Wilson G. Smillie, M.D.[1]
Fred L. Soper, M.D.
Winfield C. Sweet, M.D.
H. A. Taylor, M.D.[1]
Richard M. Taylor, M.D.
Andrew J. Warren, M.D.
Benjamin E. Washburn, M.D.
Clifford W. Wells, M.D.
D. Bruce Wilson, M.D.
Clark H. Yeager, M.D.

Special Members

Johannes H. Bauer, M.D.
Alexander W. Burke, M.D.
Joseph C. Carter
Lowell T. Coggeshall, M.D.[1]
Prescott A. Creelman, M.D.[1]
Gordon E. Davis
Brian R. Dyer
A. M. Goodman
Theodore B. Hayne, M.D.
Royal A. Henry, M.D.[1]
Willard V. King
Stuart F. Kitchen, M.D.
Oskar Klotz, M.D.
H. H. W. Kumm, M.D.

[1] Resigned

SPECIAL MEMBERS—*Continued*

Paul A. Lewis, M.D.[1]
Wray D. M. Lloyd, M.D.[2]
Estus H. Magoon
Jerome J. Mieldazis
Eugene L. Opie, M.D.
Ethel Parsons
Cornelius B. Philip
George H. Ramsey, M.D.[2]
Edward J. Scannell, M.D.[2]
Raymond C. Shannon
Lucian C. Smith, M.D.
Wendell J. Stainsby, M.D.[2]
A. Maurice Wakeman, M.D.[3]
Allen M. Walcott, M.D.

[1] Died June 30, 1929
[2] Resigned
[3] Died March 2, 1929

DIVISION OF MEDICAL EDUCATION

Report of the Director

To the President of the Rockefeller Foundation:
Sir:

I have the honor to submit herewith my report as Director of the Division of Medical Education for the period January 1, 1928, to December 31, 1928.

Respectfully yours,
RICHARD M. PEARCE
Director

DIVISION OF MEDICAL EDUCATION

The work of the Division of Medical Education in 1928 included assistance to medical education and nursing education and to certain miscellaneous activities in the fields of medicine and biology.

Summary of Activities

I. Medical Education

1. Visits and Surveys by Staff

Austria	Ireland
Belgium	Java
Canada	Netherlands
China	Norway
Denmark	Philippine Islands
England	Rumania
France	Siam
Germany	Switzerland
Hungary	United States
India	Yugoslavia

2. International Exchange of Information

a. Visits of teachers or administrators from

Bulgaria	India
Canada	Switzerland

b. Publications

"Methods and Problems of Medical Education" Series 9, 10, and 11 (See appendix, page 351 for contents.)

3. Assistance in Improvement of Teaching and Research

a. Support of 107 fellows from 28 countries as follows:

Argentina 2	Japan 14
Austria 3	Mexico 1
Belgium 3	Netherlands 3
Brazil 3	Norway 2
Bulgaria 2	Peru 1
Canada 5	Philippine Islands 3
Estonia 1	Poland 3
France 4	Rumania 4
Germany 2	Russia 2
Haiti 11	Scotland 1
Hungary 6	Siam 9
India 2	Sweden 3
Ireland 2	Syria 3
Italy 8	Yugoslavia 4

b. Support of 18 local fellowships in Germany

c. Support of 12 fellows appointed by the Medical Research Council, Great Britain

d. Support of 9 fellows appointed by the Notgemeinschaft der Deutschen Wissenschaft

e. Support of 38 fellows appointed by the National Research Council, Washington, D. C.

f. Temporary aid to departments of medical schools

France	Italy (*continued*)
Lyon	Florence
Paris	Genoa
Strasbourg	Milan
Ireland	Naples
Belfast	Padua
Dublin	Pavia
Italy	Rome
Bologna	Turin

g. Laboratory supplies

Austria	Estonia
England	France

Germany
Hungary
Latvia
Norway
Poland
Rumania

h. Medical literature

Algeria
Austria
Belgium
Bulgaria
Czechoslovakia
Estonia
France
Hungary
Italy
Lithuania
Poland
Portugal
Rumania
Russia
Switzerland
Turkey
Yugoslavia

4. Cooperative Aid to Medical Institutions

American University of Beirut, Syria
Free University of Brussels
University of Cambridge
Chulalongkorn University, Bangkok, Siam
Dalhousie University, Halifax, Nova Scotia
University of Edinburgh
Harvard School of Public Health
National School of Medicine and Pharmacy, Haiti
Keio University, Tokyo, Japan
University of Lyon, France
University of Montreal, Canada
Institute for Psychiatric Research, Munich, Germany
University of Nancy, France
Faculty of Medicine, São Paulo, Brazil
University of Strasbourg, France
University of Utrecht, Netherlands
University of Zagreb, Yugoslavia

II. Activities in China

1. Aid to Medical Schools

Shanghai Union Medical College
Shantung Christian University Medical School

2. Aid to Premedical Sciences in Colleges and Universities

Central National University (formerly National Southeastern University)
Fukien Christian University
Ginling College
Lingnan University (formerly Canton Christian College)
Nankai University
University of Nanking
St. John's University
Shanghai College
Shantung Christian University
Soochow University
Tsing Hua College
Yenching (Peking) University

3. Aid to Hospitals

American Baptist Foreign Mission Society
- Ningpo Hospital
- Shaohsing Hospital

American Board of Commissioners for Foreign Missions
- Fenchow Hospital
- Tehchow Hospital

Board of Foreign Missions of the Methodist Episcopal Church
- Wuhu Hospital

Board of Missions of the Methodist Episcopal Church, South
- Soochow Hospital
- Huchow Hospital

Board of Foreign Missions of the Presbyterian Church in the United States
- Changteh Hospital
- Chefoo Hospital
- Hwaiyuen Hospital
- Paotingfu Hospital

Church of Scotland Foreign Mission Committee
Ichang Hospital
Domestic and Foreign Missionary Society of the Protestant Episcopal Church in the United States
Anking Hospital
Foreign Mission Board of the Southern Baptist Convention
Yangchow Hospital
United Christian Missionary Society
Luchowfu Hospital
Nantungchow Hospital
University of Nanking Hospital
Women's Foreign Missionary Society of the Methodist Episcopal Church
Sleeper Davis Memorial Hospital (cooperating with the School of Nursing of the Peking Union Medical College)

4. Other Activities in China

a. Aid to National Medical Association of China
b. Aid to China Medical Association
c. Aid towards anthropological research at Chou K'ou Tien
d. Small appropriation from a special fund for local institutions

5. Fellowships

a. For study in the United States and Europe	53
Chinese	37
Americans and Europeans	16
b. For study in China	72
Chinese in the Peking Union Medical College	47
Chinese in the Shantung Christian University Medical School	2
Chinese in Yenching University (premedical studies)	3
Americans and Europeans in the Peking Union Medical College	20

6. Maintenance of the Peking Union Medical College

III. Nursing Education

1. Surveys and Visits

Austria
Belgium
Bulgaria
Canada
England
France
Hungary
Ireland
Italy
Poland
Rumania
United States
Yugoslavia

2. Visits of Teachers and Administrators from

Canada
France
Poland
United States

3. Support of Fellows from

Austria
Bulgaria
Canada
England
France
Hungary
Japan
Poland
Rumania
Siam
Yugoslavia

4. Aid to Schools of Nursing

Yale University School of Nursing, New Haven, Connecticut

D. Ogden Mills Training School for Nurses, Trudeau Sanatorium, Saranac Lake, New York

School of Nursing, Vanderbilt University, Nashville, Tennessee

George Peabody College for Teachers, Nashville, Tennessee

College of Nursing, St. Luke's International Hospital, Tokyo, Japan

School of Nursing, Siriraj Hospital, Bangkok, Siam

School for Nurses, University of Lyon, France

School of Public Health and Bedside Nursing, Zagreb, Yugoslavia

School of Public Health and Bedside Nursing, University of Cracow, Poland
State School of Nursing, Warsaw, Poland
School of Nursing, University of Debreczen, Hungary
State Central School of Nursing, Budapest, Hungary
University College Hospital Nurses' Home and School, London, England

5. Aid to Committee on Grading of Nursing Schools, New York City

IV. Miscellaneous Activities

1. Aid for Biological Education and Research

The Johns Hopkins University, Baltimore, Maryland
Yale University, New Haven, Connecticut
University of Hawaii, Honolulu, Hawaii
Tohoku Imperial University, Sendai, Japan
Bernice P. Bishop Museum, Honolulu, Hawaii
Australian National Research Council, Sydney, Australia
Support for publication of *Biological Abstracts*

2. Assistance through Other Agencies

National Committee for Mental Hygiene, New York City
Canadian National Committee for Mental Hygiene
New York Academy of Medicine
Commission on Medical Education
Research and teaching in hospital and clinic service
United Hospital Fund
American Medical Association towards support of Spanish edition of its Journal
American Conference on Hospital Service

3. Fellowships

Administered by the Rockefeller Foundation (human biology) 9
Administered by other agencies
National Committee for Mental Hygiene, New York 8

Medical Education

During the year visits and surveys were made in twenty countries by members of the staff of the division. To further exchange of information on progress in medicine and medical teaching, provision was made for five medical professors or administrators from four countries to visit medical institutions of countries other than their own, as guests of the Foundation; three issues of "Methods and Problems of Medical Education" were published containing articles, by teachers and other authorities, on medical institutions and teaching methods in various parts of the world; and fellowships were granted for research and for the additional preparation of young doctors for definite posts in medical schools. The provision of laboratory supplies or medical literature was continued in twenty-one countries, and capital aid was given for the development of certain medical institutions.

Visits and Surveys

In connection with programs already under way or projected, members of the staff visited

medical institutions in Austria, Belgium, Canada, China, Denmark, England, France, Germany, Hungary, India, Ireland, Java, the Netherlands, Norway, the Philippine Islands, Rumania, Siam, Switzerland, the United States, and Yugoslavia.

International Exchange of Information

Visitors from Foreign Countries.—Five prominent medical teachers and administrators from Bulgaria, Canada, India, and Switzerland visited medical institutions in Canada and the United States as guests of the Foundation. Dr. St. John MacDonald, professor of hygiene in the department of public health and preventive medicine of McGill University, Montreal, studied public health institutions and organizations in the eastern part of the United States, particularly in the South. Colonel R. A. Needham, for several years deputy director general of the Indian Medical Service in charge of medical education, and Lieutenant Colonel A. D. Stewart, professor of hygiene and public health in the Calcutta School of Tropical Medicine and Hygiene, came to America from England; Colonel Needham studied especially institutions of medical education, and Lieutenant Colonel Stewart schools and institutions of hygiene. Professor Hans W. Maier, newly installed head of the Psychiatric Clinic in Zurich, Switzerland, visited

psychiatric institutes. Dr. T. Petroff, professor of hygiene in the faculty of medicine of the University of Sofia, Bulgaria, studied teaching and administration of public health work not only in Canada and the United States, but also in France and England.

In addition, assistance in the form of suggestions and letters of introduction was given by both the New York and European offices of the Foundation to many visitors traveling independently who requested advice concerning the opportunities for studying certain aspects of medical education.

Publications.—Series 9, 10, and 11 of "Methods and Problems of Medical Education" were published and distributed in the course of the year. Series 9 deals with institutes and systems of legal medicine in seventeen countries. Series 10 includes articles on libraries and departments of hygiene, bacteriology, pathology, pharmacology, anatomy, and physiology in medical schools in fourteen countries. Series 11 consists of articles on clinical subjects by authors in five countries. The tables of contents of these volumes will be found in the Appendix, page 351.

Fellowships

Fellowships were granted to supplement the training of young graduate physicians, in prepa-

ration for definite positions as teachers and investigators to which they were to return on completion of their studies. These fellowships were given on application through the authorities of the medical schools which would have the advantage of the additional training of the fellows, and chiefly for schools with which the Foundation was otherwise cooperating.

In addition to fellowships awarded to men from China, which are referred to in the section of this report dealing with medical education in that country, the Foundation administered directly 107 fellowships in medicine. Fourteen of the fellows came from Japan, eleven from Haiti, nine from Siam, eight from Italy, six from Hungary, five from Canada, four each from France, Rumania, and Yugoslavia, three each from Austria, Belgium, Brazil, the Netherlands, the Philippine Islands, Poland, Sweden, and Syria, two each from Argentina, Bulgaria, Germany, India, Ireland, Norway, and Russia, and one each from Estonia, Mexico, Peru, and Scotland. Twenty of these studied chemistry; seventeen pathology, bacteriology, or immunology; thirteen physiology; ten anatomy, histology, embryology, or cytology; nine medicine or medical specialties; eight surgery or surgical specialties; seven hygiene; five pharmacology; three each biology, obstetrics and gyne-

cology, pediatrics, and physics; two tropical diseases and parasitology; and one each ophthalmology, psychiatry, roentgenology, and sanitary engineering. The studies were carried on in Austria, Belgium, Canada, Czechoslovakia, Denmark, England, France, Germany, Italy, Switzerland, the Netherlands, Tunis, and the United States.

To further exchange of medical experience funds were supplied to the Medical Research Council of Great Britain and to the Notgemeinschaft der Deutschen Wissenschaft to support fellows from their countries for work in the United States. Twelve fellowships were in force under the British Medical Research Council: two each in biochemistry, pediatrics, and physiology, and one each in psychiatry and in studies of cancer, the central nervous system, diseases of the blood, diseases of the chest, and diseases of the endocrine system. Under the Notgemeinschaft der Deutschen Wissenschaft nine fellows were supported, three in physiology, two in pathology, and one each in chemistry, internal medicine, obstetrics, and psychiatry and psychology. Eighteen local fellowships were also supported in Germany.

To develop a larger number of medical teachers and investigators for the United States and Canada funds were furnished to the National Research Council, Washington, D. C., by which

thirty-eight fellows in medicine were supported. Some of these studied more than one subject, eleven studying physiology, including preparatory physics and mathematics; nine organic chemistry and biochemistry; five pathology; five neurology and neurosurgery; four medicine (general and experimental); three surgery, including experimental surgery and surgical pathology; three pharmacology and therapeutics; and one each anatomy, bacteriology and serology, parasitology, and psychiatry. These fellowships are granted usually for work in the United States, but in 1928 ten of the thirty-eight were for study in Europe (Austria, England, France, Germany, and Sweden).

Developmental Aid

The program, in force since 1925, of aiding in the development of future teachers and investigators through assistance, for apparatus, medical literature, stipends, or research expenses, to medical school departments which are especially active in attracting and training younger men, was extended during 1928 to the department of pathological anatomy of the University of Paris, and in Ireland to the department of pathology of the Queen's University, Belfast, and the School of Pathology and Hygiene of Trinity College, Dublin. In all, twenty-two departments in three

schools of France, two of Ireland, and nine of Italy received such aid in 1928.

Laboratory Supplies

Aside from the above-mentioned aid, minor assistance in the form of laboratory supplies was furnished during the year to further the work of former Foundation fellows and other selected persons. These grants were distributed as follows: two in Austria, one in England, one in Estonia, five in France, one in Germany, two in Hungary, one in Latvia, one in Norway, two in Poland, and two in Rumania.

Medical Literature

Aid in supplying medical literature of other countries, first begun as a postwar relief measure, though diminishing elsewhere, was undertaken on a larger scale in Russia during 1928 following a survey of the needs of that country made in the preceding year.

During 1928 medical literature was furnished to two medical institutes or departments in Algeria, two in Austria, four in Belgium, eleven in Bulgaria, twenty-four in Czechoslovakia, one in Estonia, thirty-five in France, one in Hungary, sixty-four in Italy, one in Lithuania, thirty-four in Poland, three in Portugal, sixteen in Rumania, thirty-three in Russia, two in Switzer-

land, one in Turkey, and thirteen in Yugoslavia.

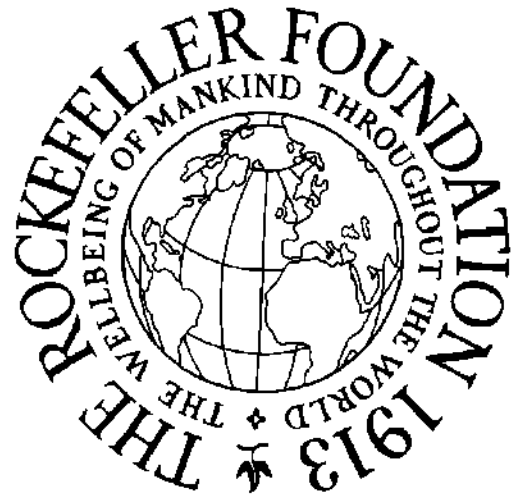
Aid to Medical Institutions

New Undertakings

All-India School of Hygiene and Public Health, Calcutta.—During 1927 and 1928 an extensive survey was made of medical institutions and conditions in medical education throughout India. It was learned that graduate courses leading to degrees in hygiene were being developed in the country and that the need existed for some one school with staff and facilities planned for the higher training of personnel for the more responsible positions connected with the teaching of hygiene and the administration of public health in India. Local authorities proposed to use as a foundation the Calcutta School of Tropical Medicine and Hygiene, and there to develop an All-India School of Hygiene and Public Health. For this project the Foundation has appropriated funds. Directors of the school, under the control of the Indian Research Fund Association, will assume responsibility for all arrangements for purchase of land, planning, and construction and equipment of the building. The school will be maintained by the Government of India under the scientific control of the Indian Research Fund Association.

Graduate School of Sanitation and Public Health of the University of the Philippines, Manila.—With funds provided by the Philippine Legislature a School of Sanitation and Public Health was established in 1927 under the University of the Philippines in conjunction with its College of Medicine. The school has already found itself handicapped by insufficient teaching personnel, equipment, and financial support, and cannot therefore receive as many of the applicants for admission as would be desirable. To ease this situation, at the request of the authorities of the university and after study of the situation, the Foundation appropriated funds for the salary, for two years, of two visiting professors of parasitology and bacteriology, who would be interested also in teaching public health administration. Funds for necessary equipment, supplies, and medical literature were also appropriated. The Philippine Government on its part agreed to increase its annual appropriation for maintenance of the school.

Aid to University Departments of Public Health.—Assistance was given to departments of public health in certain universities in order to foster close relations between university and government or local public health departments or organizations, to their mutual advantage. At the University of Nancy, France, this took the form



Photograph Excised Here

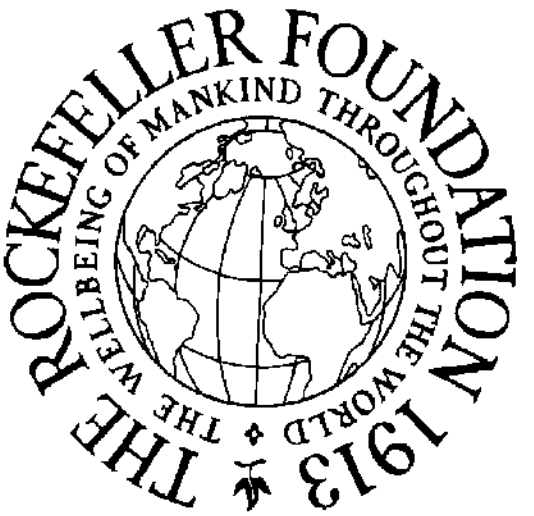
Calcutta School of Tropical Medicine and Hygiene, where the All-India School of Hygiene and Public Health is to be established with the aid of the Foundation.

Photograph Excised Here

University of the Philippines, where the Foundation is giving assistance to the Graduate School of Sanitation and Public Health.

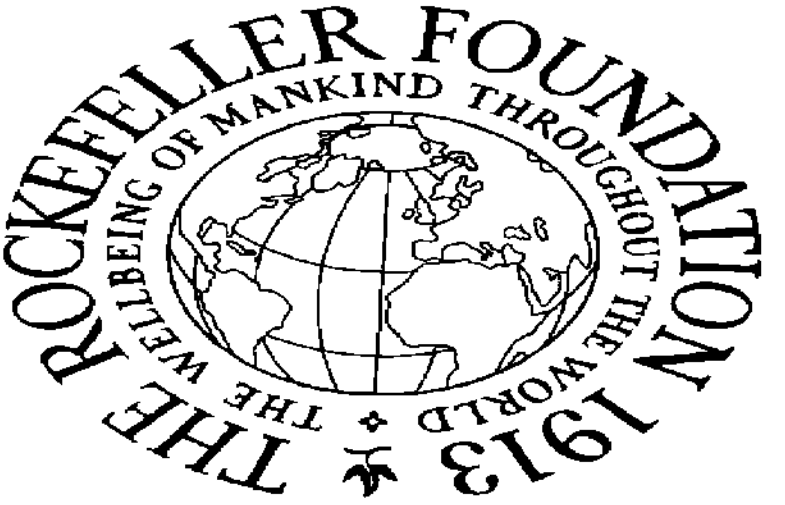
of an appropriation for a small addition to the building of the University Institute of Hygiene which will make possible a highly profitable cooperation between the institute, a well-equipped departmental health laboratory, and public health officials. To the University of Zagreb, Yugoslavia, in addition to aid previously pledged for facilities for teaching and research in the School of Public Health of the Ministry of Health, a new grant was made for establishing over a period of two years a new method of teaching hygiene to medical students by enabling them to get direct field experience in public health work in the villages under expert direction. At Dalhousie University, Halifax, Nova Scotia, salary was provided for the years 1928 and 1929 for additional teaching staff for the department of hygiene so that cooperation between the department and the university public health center might be maintained at its present high level.

University of Utrecht, the Netherlands.—The University of Utrecht has been taking steps to concentrate its medical laboratories at one site. In 1925 the Foundation appropriated funds towards the building of a laboratory of pharmacology. In order to hasten the completion of the new center, the university authorities requested assistance in erecting a laboratory for physiology



Photograph Excised Here

Three members of the commission from Lyon that visited medical institutions in various countries, as the guests of the Foundation, preparatory to drawing up plans for a medical center for the city.



Photograph Excised Here

School of Public Health of the Ministry of Health, Zagreb, Yugoslavia. Through a Foundation grant to the University of Zagreb facilities were provided in this school for the teaching of public health to the medical students of the university.

on land provided by the university at the new site. Since such aid would free university resources for the early building of a new institute of hygiene and would contribute towards the immediate strengthening of medical teaching at Utrecht, the Foundation in 1928 made an appropriation towards the cost of erecting this laboratory.

Continuation of Earlier Undertakings

Free University of Brussels.—With the completion of the laboratory buildings of the Free University of Brussels, towards the cost of which the Foundation pledged a contribution in 1920 and later agreed to make available a further sum originally intended for endowment, it became evident that new endowment would be necessary. The large contribution to the school from Belgian sources, as well as other circumstances, made it seem desirable for the Foundation to supply the endowment for the school in its new quarters. This, as well as the final installment for the laboratory buildings, was paid in 1928.

University of Edinburgh.—In 1928 the Foundation made its final annual payment on a five-year pledge to the University of Edinburgh for the development of surgical teaching and research. In view of the progress made by this department

since 1923, the Foundation acceded to a request from the university for a contribution towards capitalization of the annual grants of the last five years. An annual contribution to the chair of therapeutics, for the development of clinical teaching, was also paid in 1928, in accordance with a pledge still in force.

Keio University College of Medicine.—Final payment was made to Keio University College of Medicine, Tokyo, Japan, on a pledge of 1927 towards a building and equipment for the reorganized department of preventive medicine. Construction was practically completed in 1928 and it was expected that the building would be opened for use in the spring of 1929.

Chulalongkorn University.—Cooperation was continued with the medical and premedical schools of Chulalongkorn University, Bangkok, Siam, through payments for supplementary salaries, travel expenses, additional scientific equipment and medical literature, and other assistance for the foreign professors of anatomy, pathology, physiology, medicine, surgery, obstetrics, biology, chemistry, and physics. Fellowships were also given for the training of Siamese as future professors to succeed the present visiting professors.

Harvard School of Public Health.—To the Harvard School of Public Health appropriation

was made of the endowment pledged in 1927, covering developments in epidemiology, public health administration, child hygiene, vital statistics, physiology and hygiene, entomology, parasitology, and protozoology, and aid towards maintenance of the library.

Other Institutions Aided.—Final payment was made to the University of Strasbourg, France, for its new institute of histology. Progress was made on the new buildings for the Faculty of Medicine of the University of Lyon, France, and the Faculty of Medicine of São Paulo, Brazil, and payments were made on the Foundation pledges towards these projects. At São Paulo the provision of laboratory supplies for returned fellows was continued.

Annual payments were continued to the American University of Beirut, Syria, towards maintenance and equipment of the medical school, as well as towards support of its health center, and also to the Faculty of Medicine of the University of Montreal, for the development of its laboratories. Fellowships for the further training of staff members and funds for teaching equipment were again granted to the National School of Medicine and Pharmacy at Port au Prince, Haiti.

Buildings towards which the Foundation has contributed funds were opened during the year

at Munich, Germany, for the Institute for Psychiatric Research, and at the University of Cambridge, England, for the laboratory of pathology, for which completion of the Foundation's payments of endowment was also arranged.

Staff Changes

Dr. Robert A. Lambert, formerly director of the School of Tropical Medicine at San Juan, Porto Rico, joined the staff of the Division as associate director.

Dr. Francis W. O'Connor resigned to become associated with the College of Physicians and Surgeons of Columbia University in its department of medicine.

Miss Margery K. Eggleston resigned from the staff of the Foundation on the segregation of the administration of the Peking Union Medical College. She continues, however, as secretary of the Board of Trustees of the latter body.

Mr. N. Gist Gee was transferred at the end of the year from the Division of Medical Education to the section of Natural Sciences, which he will continue to serve in China.

Activities in China

Educational Situation

Although the present Nationalist Government of China is generally conceded to be stronger

than any other government coming into power since the revolution, its work is as yet in an avowedly disorganized condition, and the period of reconstruction will necessarily be long. The greatest immediate problem is that of the reduction of the vast standing army, but the nationalist government has already drafted a plan for the disbandment of 340,000 troops when the necessary financial resources are available. A policy of road building has been inaugurated which, besides supplying highways, one of China's most urgent needs, will give work to demobilized soldiers and to thousands of other laborers, many of them from the famine districts. There is also much agitation for the resumption of new railway construction. A vigorous attempt is being made by the Minister of Finance to put the finances of the new government on a more stable basis. It is planned to complete the mint started under the previous régime in Shanghai and to establish a unified silver currency.

Foreign colleges and universities are feeling the effects of the political uncertainty; it causes a policy of waiting on the part of their constituencies and contributors, which threatens to curtail the current work of the institutions and to make planning for the future difficult. However, in case the reforms and reconstructive measures

planned by the government are eventually put into effect, the final outcome of the situation may be a merging of interests to establish larger and stronger schools in strategic centers, and a discontinuance of the weaker and less useful institutions.

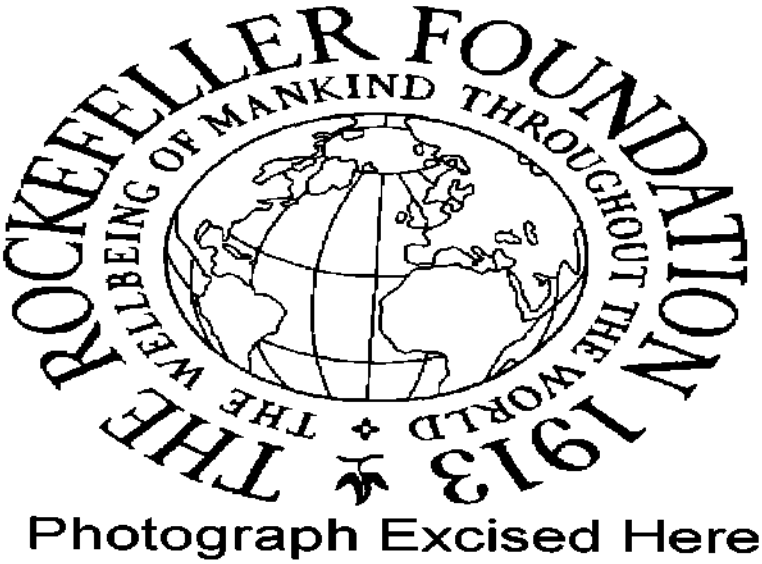
Some of the smaller mission schools which have closed may not reopen, but may instead give their support to other well-established schools. Of schools which had been aided by the Foundation, the College of Yale-in-China closed, but reopened to operate as a middle school; the Hsiang-Ya Medical College, supported by the Yale-in-China mission, has not reopened; St. John's University, with the exception of the medical department, was closed during the year 1927–1928, but reopened in the fall of 1928 with 190 middle school students and 175 university students, besides fifteen medical students receiving their training at the Shanghai Union Medical College, which is maintained by St. John's University in cooperation with the Central National University. All other universities and colleges to which the Foundation is contributing, though closed in some instances for shorter or longer periods, have kept their work in progress by various measures, such as correspondence, tutorial arrangements, and summer schools. Most of these institutions are

planning to apply for registration with the nationalist government. The University of Nanking has already been so registered. Several other applications have been filed, but the formalities of registration have not been completed in any other case. To be eligible for registration a school must have a Chinese president and a majority of Chinese on the local board of control; and the institutions that have applied for registration have naturally met these conditions. Among the mission institutions aided by the Foundation the following have a Chinese president: Lingnan University, Fukien Christian University, Ginling College, University of Nanking, Shanghai College, and Soochow University. Others are seeking suitable Chinese for that office.

Although many of the hospitals were forced to close, a majority were able to reopen after a short period. In a number of cases Chinese doctors were placed in important executive positions and were given an opportunity to develop in an administrative capacity. As in all other types of mission work, the present tendency is to throw more and more responsibility upon capable Chinese. Of the hospitals receiving aid from the Foundation six were closed or taken over by the military authorities; two of these have reopened, one has been returned to the missionary society after action by the government, and

Photograph Excised Here

New building of the department of preventive medicine, Keio University College of Medicine, Japan, erected with the aid of the Foundation.



Photograph Excised Here

One of the laboratories in the new building.

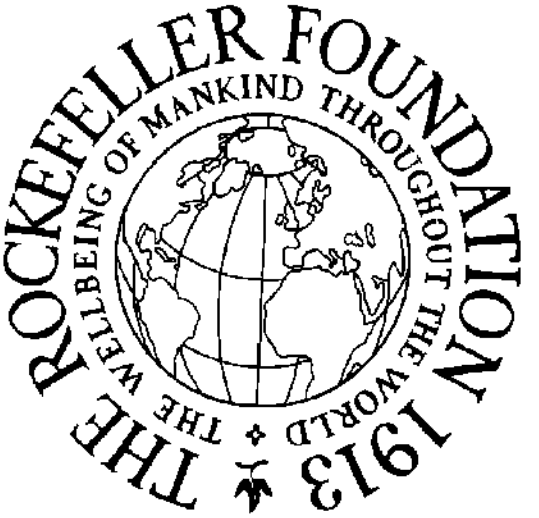
concerning three which were taken over by the military authorities no reports have been received as to present conditions.

Aid to Medical Schools

The Shanghai Union Medical College was again aided by the Foundation in 1928 by an appropriation covering a two-year period beginning July 1, 1928, in recognition of its services towards completing the education of former Hunan-Yale medical students. A grant was also made towards the budget of the School of Medicine of Shantung Christian University.

Premedical Departments

No new appropriations were made to universities or colleges for premedical work, but two existing appropriations were adjusted. With the reopening of St. John's University in the fall of 1928, action was taken by the Foundation, making available for the academic year 1928–29 the sum due the University in 1928 as the final payment on a five-year pledge for maintenance of the science departments. The National Southeastern University, which was operated by the former government, was taken over by the nationalist government and made part of the new Central National University. Inasmuch as premedical work was carried on as before, un-



Science building (*right*) and dormitory, Fukien Christian University, Foochow.

Chemistry laboratory, Fukien Christian University.

paid appropriations and balances on appropriations to Southeastern University for such work were made payable to the new university.

Aid towards general budgets for premedical work was continued at Fukien Christian University, Ginling College, Lingnan University, Nankai University, Shanghai College, Shantung Christian University, Soochow University, Tsing Hua College, and Yenching (Peking) University. Final payment was made to the University of Nanking on an appropriation for equipment for the science building.

Hospitals

The program of aid to hospitals which was begun by the China Medical Board in 1914 was practically closed in 1927, when appropriations decreasing over a short period of years were made to assist a few hospitals to arrange their finances so that future work could be carried on without further aid from the Foundation. No new appropriations were made in 1928. Permission for the transfer to one hospital of funds appropriated for the use of another was given in the case of a grant to Shuntehfu Hospital of the Board of Foreign Missions of the Presbyterian Church in the United States, which was transferred to the Chefoo Hospital of the same board, the money to be used for a nurses' home for the

latter instead of a doctors' residence for the former. For the list of hospitals receiving continued aid in 1928 see page 308.

Miscellaneous Activities

An appropriation was made to the National Medical Association of China, payable over a three-year period beginning July 1, 1928, to enable the association to employ an executive secretary, whose duties would include the development of proposals for merging the different medical associations of China and for joining with the China Medical Association in the publication of an English journal, and with the China Medical and Pharmaceutical Association in the publication of a Chinese journal. Aid was continued to the China Medical Association in accordance with a five-year agreement entered upon in 1926.

A grant was made to permit the completion of the excavations at Chou K'ou Tien,[1] which had been carried on in 1927 by the department of anatomy of the Peking Union Medical College and the Geological Survey of China with most successful results. Findings at the Chou K'ou Tien site during 1928 included a large quantity of teeth, parts of two jaws, and other fragments of a previously unknown anthropoid ape or very

[1] A village about twenty miles from Peking.

early man to which has been given the name Sinanthropus.

From a small fund administered directly by the Peking office grants were made to cover minor items of equipment or research in the Central Hospital, Peking, the Red Cross Hospital, Shanghai (used by the medical school of the Central National University), the Central National University Medical School, a pharmacy training school in Peking, and in connection with a metabolism report by Dr. R. K. S. Lim.

Fellowships

Fifty-three fellowships were given to teachers in China for study in the United States and Europe. Thirty-seven of these were awarded to Chinese, of whom nineteen studied medical subjects, eleven premedical subjects, four nursing, and three miscellaneous subjects. The remaining sixteen fellowships were held by American and European fellows. Twelve of these studied medical subjects, three premedical subjects, and one nursing. A total of sixty-seven fellows studied in the Peking Union Medical College, of whom twenty were Americans and Europeans and forty-seven Chinese. In addition, two fellowships were granted to Chinese for study in Shantung Christian University Hospital, Tsinan, and three (two in biology and one in chemistry)

to Chinese for study in Yenching (Peking) University.

Peking Union Medical College[1]

Early in June the city of Peking was peacefully transferred from the rule of the northern militarists to that of the nationalists. On June 8 the Field Marshal of the Shansi armies entered Peking with three regiments of infantry. No demonstrations were allowed and excellent order prevailed.

Because of the peaceful change of government in Peking, foreign schools were not affected; there was no falling off in the enrolment for the fall of 1928 in the Peking Union Medical College. The following tabulation gives the registration for the first trimester of 1928–29 and that for the same period of 1927–28.

STUDENT ENROLMENT

Medical School	*1927–1928*	*1928–1929*
First year	25	24
Second year	15	22
Third year	8	15
Fourth year	16	8
Fifth year (interns)	14	16
Total undergraduates	78	85
Graduate and special students	29	33
TOTAL MEDICAL SCHOOL	107	118

[1] Administration in the United States of the Peking Union Medical College as well as of the China Medical Board came under the Division of Medical Education on April 1, 1927. In September 1928 the United States office of the college was segregated and established separately at 61 Broadway, New York City.

School of Nursing		
Course I		
Prenursing course at Yenching University	9	11
First year	9	6
Second year	..*	8
Third year	6	..*
Fourth year	3	5
Course II		
First year at Yenching (freshmen)	..*	3
Second year at Yenching (sophomores)	1	3
First year at Peking Union Medical College Hospital	3	3
Second year at Peking Union Medical College Hospital	..	2
Total undergraduates	31	41
Graduate and special students	..	1
TOTAL, SCHOOL OF NURSING	31	42
GRAND TOTALS	138	160

The interruption of communication and the difficulties of travel during the past year undoubtedly, in many instances, deterred patients from going to the Peking Union Medical College Hospital. At the same time, there was an increase in the number of persons treated as compared with the previous year. Statistics taken from the past three reports of the hospital show a steady increase in patients despite highly adverse conditions:

	1925–1926	*1926–1927*	*1927–1928*
Number of patients treated	3,970	4,217	4,669
Number of outpatient visits			
New	18,997	19,285	19,701
Old	84,150	89,280	94,119
Total outpatient visits	103,147	108,565	113,820

*No class because of change in curriculum in year 1926–27. Those parts of the courses actually offered in the School of Nursing of the Peking Union Medical College Hospital now cover a period of no longer than three years.

The mortality rate for hospital cases was 4.97 as compared with 5.5 for the previous year.

Only one change was made in the organization of the medical school during the year: neurology, which had been a separate department, was incorporated in the department of medicine.

The fifth commencement of the college was held on June 13, 1928. Thirteen students, the largest graduating class thus far, received the degree of doctor of medicine. At the same time three students were awarded the diploma of the School of Nursing and the certificate of the Nursing Association of China. The Medical Alumni Association now has thirty-nine members and the Alumnae Association of the School of Nursing has fifteen.

The following staff changes are reported: the resignation of Dr. Andrew H. Woods, professor and head of the department of neurology, who is now connected with the Medical School of the University of Iowa, of which Dr. Henry S. Houghton, former director of the Peking Union Medical College, is dean; the resignation of Dr. John H. Korns, associate professor of medicine, to become director of the Bureau of Tuberculosis, at Olean, New York; the resignation of Dr. E. C. Faust, associate professor of parasitology, to become professor of parasitology at the College of Medicine, Tulane University.

Dr. Hilding Berglund, professor and head of the department of medicine at the University of Minnesota, was appointed visiting professor of medicine for the year 1928–29, during the absence on furlough of the head of the department, Professor F. R. Dieuaide. Among new appointments to the staff were the following: Dr. Max Maser Zinninger as professor and head of the department of surgery; Dr. John Forbes McIntosh as associate professor of medicine; Dr. Chester S. Keefer as associate professor of medicine, and Dr. Alexander Ashley Weech as associate professor of pediatrics for a year during the absence on furlough of Dr. Ruth A. Guy. Dr. George Y. Char, a former member of the staff, who is now medical director and chief surgeon of the Central Hospital of Peking, continues a part-time connection with the college as assistant professor of clinical surgery. Dr. Jui-heng Liu, superintendent of the hospital, was asked by the Nanking government to fill the post of vice-minister of public health. He left Peking to take up this work in November 1928. A leave of absence from the college until June 30, 1929, was granted him.

Work on the final reports of the field study in kala-azar was carried on in 1928 by Dr. C. W. Young, formerly associate professor in the department of medicine of the Peking Union

Medical College,[1] and Dr. Marshall Hertig, formerly entomologist with the kala-azar unit in the field.

Nursing Education

The Foundation has continued to work for the advancement of nursing education through surveys and visits by staff members, financing visits of teachers and administrators, providing fellowships in nursing, and aiding schools of nursing.

Surveys and Visits by Staff Members

During 1928 preliminary surveys were made of conditions in nursing education in Austria and Ireland, and fifty visits were made by staff members in Austria, Belgium, Bulgaria, Canada, England, France, Hungary, Ireland, Italy, Poland, Rumania, the United States, and Yugoslavia in connection with current programs and the supervision of fellows in nursing.

Visits of Teachers and Administrators

Eight leaders in nursing education made visits for observation and study as guests of the Rockefeller Foundation during 1928. Of these, six were Europeans who made visits in Europe, one

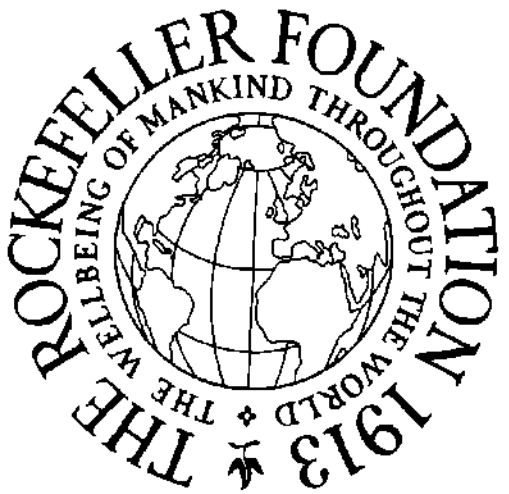
[1] Dr. Young died on January 25, 1929. Since his death, the preparation of this material for publication has been in the hands of Dr. Hertig, now with the department of comparative pathology, Harvard Medical School.

came from France to Canada and the United States, and one went from Canada to England and France.

Mlle. Greiner, of the Central Bureau of Nurses, Office d'Hygiène, France, and also director of nurses at the École de Puériculture in Paris, visited Montpellier, France; Sisters Dalban, Pinet, and Demeure, all engaged in teaching nursing at the Hôtel-Dieu, Lyon, visited Brussels, London, Paris, and Nantes; and Dr. Gardère, director of the Health Center at Lyon, visited Warsaw, Vienna, and Brussels. Mlle. Chrzanowska, instructor in public health nursing at the School of Public Health and Bedside Nursing, Cracow, Poland, visited Brussels. Miss Gladys Hiscocks, instructor in nursing at Toronto University, visited England, France, and the United States. Mlle. Jouffray, instructor in the School of Nursing at Lyon, visited the United States and Canada.

Fellowships in Nursing

Contingent upon a specified plan of development, fellowships in nursing are awarded for training for supervisory and administrative positions in connection with projects to which assistance has already been given. Forty-three such fellowships were held during 1928 by nurses on study leave from the following countries:



Photograph Excised Here

Class of 1928, Peking Union Medical College.

Photograph Excised Here

A trachoma clinic at the Peking Health Center. The Peking Union Medical College aids the city authorities in maintaining this center, where medical and nursing students receive training in public health work and health service is given to a district of the city.

Austria, Bulgaria, Canada, England, France, Hungary, Japan, Poland, Rumania, Siam, and Yugoslavia.

Visits in 1928 or 1929 for observation and study at the Yale University School of Nursing were made possible for twenty-five specially selected teachers from nursing schools in the United States and Canada (see Appendix, page 355). These visits were decided upon because of the belief that the Yale school has initiated and developed certain teaching methods which are unusual and worthy of general adoption. Arrangements were also made for these teachers to visit Butler Hospital, Providence, Rhode Island, and the East Harlem Nursing and Health Center in New York City, and to observe the rural public health nursing carried on by the state Department of Health in Alabama.

Aid to Schools of Nursing

Aid towards the maintenance of educational features was given to the D. Ogden Mills Training School for Nurses, Trudeau Sanatorium, Saranac Lake, New York; the Yale University School of Nursing; the George Peabody College for Teachers and the School of Nursing, Vanderbilt University, both at Nashville, Tennessee; the School of Nursing, Siriraj Hospital, Bangkok,

Photograph Excised Here

Class in principles and practise of nursing, Yale University School of Nursing.

Photograph Excised Here

A lesson in dietetics at the School for Nurses, University of Lyon, France.

Siam; and the College of Nursing, St. Luke's International Hospital, Tokyo, Japan. In Europe, to improve teaching and as a contribution towards maintenance, aid was given to the School of Nurses, University of Lyon, France; the School of Public Health and Bedside Nursing, Zagreb, Yugoslavia; the School of Public Health and Bedside Nursing, University of Cracow, Poland; the State Central School of Nursing, Budapest, and the School of Nursing, University of Debreczen, Hungary. Capital aid was given to the State School of Nursing, Warsaw, Poland, for building and equipment; to University College Hospital, London, for its nurses' home and school; and to the Yale University School of Nursing and the College of Nursing of St. Luke's International Hospital, Tokyo, for endowment of teaching.

Committee on Grading of Nursing Schools

Aid was continued to the Committee on Grading of Nursing Schools, in accordance with a pledge to assist this committee for the five-year period 1927–1931 in its study of the problems of nursing in the United States.

Staff Changes

Miss Alice Linton, special member of the nursing staff serving in Europe, resigned during 1928.

Miscellaneous Activities

Pending the reorganization of the Foundation, effective at the beginning of 1929, the Division of Medical Education carried during 1928 responsibility for continuing programs in human biology and a few miscellaneous programs.

In the biological field, aid was continued for the following projects: at the Johns Hopkins University, studies of duration of life and of human genetics; at Yale University, research in the behavior and habits of primates; at the University of Hawaii, Honolulu, studies of race biology; at the Bernice P. Bishop Museum in Honolulu, research in Polynesian ethnology and anthropology; at Australian universities (through the Australian National Research Council), anthropological studies; and at Tohoku Imperial University, Sendai, Japan, the salary of a visiting professor of biology was provided. Support was continued through the National Research Council, Washington, D. C., for editorial service in connection with the publication of *Biological Abstracts* under the Union of American Biological Societies.

Contributions were again made to the National Committee for Mental Hygiene in New York City for its general expenses and for surveys in the care and treatment of mental diseases, and to the Canadian National Committee for Mental Hygiene for studies of school children.

A grant was made to the New York Academy of Medicine for additions to its library; and payment was made on endowment previously pledged for the educational services of this institution.

Studies of hospital service and the training of executives for such service were continued. Payments, in accordance with previous pledges, were made to the Commission on Medical Education for study of the medical curriculum, to the United Hospital Fund of New York City in connection with transferring to permanent agencies activities formerly carried on by the Committee on Dispensary Development, and to the American Medical Association in connection with the expenses of the Spanish edition of its Journal. A payment was also made to the American Conference on Hospital Service for maintenance of its Hospital Library and Service Bureau for the year beginning July 1, 1928.

Fellowships

Fellowships were supported directly by the Foundation in the general field of human biology for one fellow from Australia, four from Canada, one from Japan, two from New Zealand, and one from the United States. Seven of these studied neurology, psychiatry, or psychology, one studied genetics and vital statistics, and one

anthropology. The studies were carried on in Canada, Europe, Hawaii, or the United States.

With funds provided by the Foundation, fifty-three fellowships in the biological sciences, twenty-eight fellowships in physics, twenty-seven in chemistry, and twenty-five in mathematics were administered by the National Research Council, Washington, D. C. Eighteen fellowships in anthropology and related subjects were administered by the Australian National Research Council, and eight fellowships in psychiatry and psychology by the National Committee for Mental Hygiene in New York.

STAFF OF THE DIVISION OF MEDICAL EDUCATION DURING 1928

Richard M. Pearce, M.D., *Director*

ASSOCIATE DIRECTORS

Alan Gregg, M.D.
William S. Carter, M.D.
Robert A. Lambert, M.D.

ASSISTANT DIRECTORS

Francis W. O'Connor, M.R.C.S.[1]

Daniel P. O'Brien, M.D.
F. Elisabeth Crowell
Mary Beard

FIELD DIRECTORS

N. Gist Gee[2]
Hazel A. Goff
Ethel C. Johns
Mary E. Tennant

SPECIAL MEMBER

Alice Linton [1]

ASSISTANT

Margery K. Eggleston [1]

[1] Resigned during 1928.
[2] Transferred January 1, 1929, to Natural Sciences section of the Foundation.

APPENDIX

I

Tables of Contents of Series 9, 10, and 11 of Methods and Problems of Medical Education

Ninth Series

Institute of Legal Medicine, University of Cluj, Cluj, Rumania, by NICULAIE MINOVICI

Department of Forensic Medicine, University of Edinburgh, Edinburgh, Scotland, by HENRY HARVEY LITTLEJOHN

Forensic Medicine Department, University of Glasgow, Glasgow, Scotland, by JOHN GLAISTER

Institute of Pathology and Forensic Medicine, Lund, Sweden, by EINAR SJOVALL

Das Gerichtsärztliche Institut der Universität Basel, Basel, Switzerland, von S. SCHONBERG

Institute of Legal Medicine at Geneva, Switzerland, by F. NAVILLE and ED. ROSSELET

Medizin und Recht, von HEINRICH ZANGGER

The Massachusetts Medicolegal System with Proposals and Plans for a Boston Pathological Institute, by TIMOTHY LEARY

Responsibility of the Chief Medical Examiner of New York City in Relation to Medical Progress, Education, and Research, by CHARLES NORRIS

Origin, Development, and Status of Legal Medicine in Modern Times, Status of Legal Medicine in Denmark, and Description of Institute of Legal Medicine, Copenhagen, by KNUD SAND

L'Institut de Médecine Légale de la Faculté de Médecine de Lyon, Lyon, France, par ÉTIENNE-MARTIN

Les Morgues Parisiennes et l'Institut Médico-Légal de l'Université de Paris, par V. BALTHAZARD

Tenth Series

Department of Bacteriology and Hygiene, University of Alberta, Edmonton, Canada, by ALLAN C. RANKIN

Institute of Hygiene, Royal Hungarian Elisabeth University, Pécs, Hungary, by BÉLA FENYVESSY

Teaching of Hygiene, Faculty of Medicine, Jassy, Rumania, by M. CIUCA

Department of Hygiene and Bacteriology, Western Reserve University, Cleveland, Ohio, by ROGER G. PERKINS

Department of Public Health, Yale University, New Haven, Connecticut, by C.-E. A. WINSLOW

School of Hygiene and Public Health, University of Pennsylvania, Philadelphia, Pennsylvania, by A. C. ABBOTT

Department of Pathology, Czech University, Prague, Czechoslovakia, by RUDOLF KIMLA

Department of Pathology and Bacteriology, University of Leeds, School of Medicine, Leeds, England, by MATTHEW J. STEWART

Institute of General Experimental Pathology, Royal University of Florence, Florence, Italy, by ALESSANDRO LUSTIG

Institute of Pharmacology, Tübingen, Germany, by CARL JACOBJ

Institute of Pharmacology, Royal Hungarian Elisabeth University, Pécs, Hungary, by G. MANSFELD

Department of Physiology and Pharmacology, University of Alberta, Edmonton, Canada, by ARDREY W. DOWNS

Institute of Physiology and General Pathology, Debreczen, Hungary, by FREDERIC VERZÁR

Department of Physiology, University of Leeds, School of Medicine, Leeds, England, by B. A. MCSWINEY

Institute of Physiology, Royal University of Milan, Milan, Italy, by CARLO FOÁ

Institute of Physiology, University of Bern, Bern, Switzerland, by LEON ASHER

Institute of Physiology, University of Concepción, Chile, by ALEXANDER LIPSCHÜTZ

Departmental Libraries of the School of Medicine of Western Reserve University, Cleveland, Ohio, by TORALD SOLLMANN

Lane Medical Library, Stanford University, Stanford, California, by GEORGE T. CLARK

How to Use a Medical Library, by CHARLES FRANKENBERGER

Library of the School of Medicine and Dentistry, University of Rochester, Rochester, N. Y., by DONALD B. GILCHRIST

The Building and Equipment of the Faculty of Medicine of the University of Manitoba, Winnipeg, Canada, by A. N. MACLEOD, J. C. B. GRANT, F. T. CADHAM, A. T. CAMERON, WILLIAM BOYD, and V. H. K. MOORHOUSE

Die Medizinische Schule in Soerabaja, Soerabaja, Java, von A. E. SITSEN

King Edward VII College of Medicine, Singapore, Straits Settlements, by G. H. MACALISTER

Research and Educational Hospital, Research Laboratory, and Library, University of Illinois and State Department of Public Welfare, Chicago, Illinois, by DAVID J. DAVIS and WILLIAM F. PETERSEN

Department of Pharmacology and Therapeutics, University of Illinois, College of Medicine, Chicago, Illinois, by HUGH ALISTER MCGUIGAN

Department of Anatomy, University of Illinois, College of Medicine, Chicago, Illinois, by V. E. EMMEL

Department of Physiology and Physiological Chemistry, University of Illinois, College of Medicine, Chicago, Illinois, by WILLIAM HENRY WELKER

Department of Pathology and Bacteriology, University of Illinois, College of Medicine, Chicago, Illinois, by WILLIAM F. PETERSEN

Illustration Studios of the Colleges of Medicine and Dentistry of the University of Illinois, Chicago, Illinois, by THOMAS S. JONES

Demonstration of Biologic Experiments by Optical Projection Methods, Western Reserve University, Cleveland, Ohio, by MORTON S. BISKIND

Dutch Central Institute for Brain Research, Amsterdam, The Netherlands, by C. U. ARIENS KAPPERS

Imperial Government Institute for Nutrition, Tokyo, Japan, by TADASU SAIKI

Eleventh Series

La Clinique Médicale B de l'Université de Strasbourg, par Léon Blum
Die Medizinische Klinik und Poliklinik der Universität Breslau, von Wilhelm Otto Stepp
Die Medizinische Klinik der Medizinischen Akademie in Düsseldorf, von August Hoffmann
Adaptation d'un Service de Médecine Générale à l'Étude et à l'Enseignement de la Cardiologie, Paris, France, par Camille Lian
Department of Pediatrics, College of Medicine, University of Cincinnati, Cincinnati, Ohio, by A. Graeme Mitchell
The Metabolism Ward of the Russell Sage Institute of Pathology, New York, New York, by Eugene F. DuBois
Pediatrics at Harvard Medical School, Boston, Massachusetts, by Harold C. Stuart
Medical Clinic, the Johns Hopkins Hospital, Baltimore, Maryland, by Warfield T. Longcope
The Womans Clinic of the Johns Hopkins Hospital and University, Baltimore, Maryland, by J. Whitridge Williams
The Education of the Surgeon, by Elliott C. Cutler
Die Chirurgische Universitäts Klinik zur Königsberg I. Pr., von Martin Kirschner
The Royal Ear Hospital, Ear, Nose, and Throat Department of University College Hospital, London, England, by Herbert Tilley
Die Dermatologische Klinik der Universität Breslau, von Josef Jadassohn
Die Universitäts-Augenklinik, Münster in Westfalen, von Aurel v. Szily
Eye Clinic No. 1 of the Royal Hungarian Petrus Pázmány University at Budapest, by Emile de Grósz
Out-Patient Department of the London Hospital, by Arthur W. M. Ellis
The Out-Patient Department of the Children's Memorial Hospital, Chicago, Illinois, by Joseph Brennemann
The Out-Patient Clinic in Otolaryngology of the Central Free Dispensary, Chicago, Illinois, by George E. Shambaugh
The Clinic, Cornell University Medical College, New York, New York, by Walter C. Klotz
Out-Patient Service of the Department of Dermatology and Syphilology in the Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania, by John H. Stokes
New Out-Patient Building, the Johns Hopkins Hospital, Baltimore, Maryland, by Winford H. Smith
Diagnostic Laboratory of the Cleveland City Hospital, Cleveland, Ohio, by Howard T. Karsner

These bulletins are intended for distribution to teachers and administrators in medical schools and hospitals. Separate reprints and a limited number of volumes are distributed gratis to other interested persons upon application to the Rockefeller Foundation.

II

List of Teachers in Schools of Nursing in Canada and the United States who Participated in Observation Visits to Yale University School of Nursing and Other Centers

Nurses	Hospital	State
Sarah E. Moore	New York Hospital	New York
Blanche Edwards	Bellevue Hospital	New York
Kathleen M. Leahy	Department of Nursing Education, University of Washington	Washington
Louise Kieninger	School of Medicine and Hospitals, University of Colorado	Colorado
Frieda Koenig	St. Mary's Hospital	Minnesota
Mary Giles	University Hospital	Michigan
Arta Lewis	Mary Lanning Hospital	Nebraska
Mary Hackard	Indiana University	Indiana
Gladys Strum	Victoria General Hospital	Nova Scotia
Myra Tucker	University Hospital	Nebraska
Jane Murphy	Montreal General Hospital	Canada
Ruth Johnson	Walter Reed General Hospital	Washington, D. C.
Eleanor Lee	Presbyterian Hospital	New York
Marguerite Andell	Roper Hospital	South Carolina
Edith Brodie	Vanderbilt University Hospital	Tennessee
Ruth Berry	University of Virginia Hospital	Virginia
Margaret Dulmage	Toronto General Hospital	Canada
Ruth Evans	Western Reserve University	Ohio
Mary Gilmore	Peter Bent Brigham Hospital	Massachusetts
Mable Hay	The Johns Hopkins Hospital	Maryland
Gwendolyn Johnston	Doernbecher Memorial Hospital	Oregon
Margaret McClanahan	Stanford University Hospital	California
Edith Potts	Pasadena Hospital	California
Ruth Wheelock	Community Hospital	California
Marion Zilley	State of Wisconsin General Hospital	Wisconsin

THE ROCKEFELLER FOUNDATION

Report of the Treasurer

To the President of The Rockefeller Foundation:
Sir:

I have the honor to submit herewith my report of the financial operations of The Rockefeller Foundation and its subsidiary organizations for the period January 1, 1928, to December 31, 1928.

Respectfully yours,

L. G. MYERS
Treasurer

TREASURER'S REPORT

The following table summarizes transactions relating to income, disbursements, and appropriations:

Undisbursed income on hand January 1, 1928	$7,207,426.60
Income from General Fund	9,175,550.13
Sundry refunds	52,815.55
Total amount available for disbursement	$16,435,792.28
Disbursements on account of appropriations	9,690,738.52
Balance of income undisbursed on December 31, 1928	$6,745,053.76
Unpaid appropriations and commitments effective in 1928 and prior years	5,057,632.42
Balance	$1,687,421.34

Appropriations and pledges effective in 1929 and following years, amounting to $16,698,477, as shown in the annexed balance sheet, are not included in the foregoing figures. They have been considered as charges against the income of the years in which they fall due, but after the close of the year the new corporation provided

for them by setting aside an equal amount of principal.

Income amounting to $444,846.32 was received on January 2, 1929. It is not included in 1928 income, but as this is the last report of the Foundation, which went out of existence on January 3, to be succeeded by the consolidated corporation of the same name, the item is referred to in this report.

The balance sheet carries in suspense the sum of $161,905.73, representing 1929 income received in 1928. As this is an asset of the new Foundation it is accounted for only in the manner stated.

In addition to payments from income, the sum of $12,000,000 in securities, accrued interest, and cash was paid from principal to the China Medical Board, Incorporated. The Principal Fund was thereby reduced to $150,291,624.50.

By resolution of the Members of the Foundation, adopted on November 9, 1928, Peking Union Medical College property, carried in the accounts at $9,258,515.03, was transferred to the China Medical Board, Incorporated. The total invested in land, buildings, and equipment amounted, therefore, on December 31, 1928, to $422,973.63, as shown on page 412.

Since the close of the year the accounts of the Comptroller, the accounts of the Treasurer, and

the securities owned by the Corporation have been examined by Squires and Company, accountants, who have rendered a report to the Chairman.

The financial condition and operations are set forth in the appended exhibits, listed below:

EXHIBIT A

BALANCE SHEET—DECEMBER 31, 1928

ASSETS

I. INVESTMENT		
General Fund		
Securities (Exhibit I)		$127,602,161.41
Secured demand loans		22,689,463.09
		$150,291,624.50
II. LAND, BUILDINGS, AND EQUIPMENT (Exhibit H)		
In New York	$45,832.43	
In Paris	68,000.00	
In China	309,141.20	
		$422,973.63
III. SUSPENSE		
1929 income received in 1928		$161,905.73
IV. INCOME ACCOUNTS		
General Fund		
Cash on deposit	$78,254.82	
Secured demand loans	4,298,631.18	
		$4,376,886.00
Foreign currencies		
Czechoslovakian kronen	$26,880.05	
Sterling	69,042.69	
		95,922.74
Funds in hands of agents to be accounted for, and sundry accounts receivable	$2,296,382.12	
Less accounts payable	24,137.10	
		2,272,245.02
TOTAL		$6,745,053.76
Excess of appropriations and pledges over income available		15,011,055.66
		$21,756,109.42
GRAND TOTAL		$172,632,613.28

NOTE.—Income amounting to $444,846.32 was received on January 2, 1929. This simply increased cash and demand loans by that figure.

EXHIBIT A

BALANCE SHEET—DECEMBER 31, 1928

FUNDS AND OBLIGATIONS

I. FUNDS			
General Fund			$150,291,624.50
II. LAND, BUILDINGS, AND EQUIPMENT FUND			
Appropriations from income			$422,973.63
III. SUSPENSE			
1929 income received in 1928			$161,905.73
IV. INCOME ACCOUNTS			
General Fund:			
Balance due on appropriations payable in 1928 and prior years		$5,057,632.42	
Appropriations and pledges effective in 1929 and following years:			
1929	$10,796,933.00		
1930	3,559,296.00		
1931	1,237,213.00		
1932	622,525.00		
1933	375,550.00		
1934	106,960.00	16,698,477.00	$21,756,109.42*
GRAND TOTAL			$172,632,613.28

* This total of all unpaid appropriations and pledges is $15,011,055.66 in excess of the balance of general fund income amounting to $6,745,053.76, as shown on opposite page, but it will be noted that these obligations become effective over a term of years, thus permitting their satisfaction gradually as the income of the respective years is received.

EXHIBIT B

STATEMENT OF RECEIPTS AND DISBURSEMENTS OF INCOME

RECEIPTS			
Balance, December 31, 1927		$7,207,426.60	
Refunds of payments made in prior years		52,815.55	
			$7,260,242.15
Income for the period January 1, 1928, to December 31, 1928			9,175,550.13
			$16,435,792.28
DISBURSEMENTS			
CENTRAL ADMINISTRATION			
General Budget			
Maintenance of New York, European, and Far Eastern offices	$600,357.60		
Emergency fund: China	36,042.00		
Memorials for Dr. Adrian Stokes	20,197.07		
Fellowships: Contingent fund	44.95		
Capital Requirements			
China Medical Board, Incorporated, from principal, $12,000,000 (see Statement of Principal Fund on page 411)		$656,641.62	
INTERNATIONAL HEALTH DIVISION			
General Budget			
Hookworm work	$100,374.03		
County health work	410,605.41		
Malaria work	204,275.00		
Yellow fever work	278,426.25		
State health services			
Development of essential divisions			
Epidemiology	$19,637.10		
Sanitary engineering	5,602.23		

Vital statistics	$15,389.45		
Public health laboratory service	22,077.38		
Public health nursing	12,933.54		
Other services	11,796.81		
		$87,436.51	
Bureaus for study and reform of public health activities		27,731.27	
Health Organization of League of Nations		110,218.60	
Public health education			
Fellowships, training of health workers, and aid to schools of hygiene		336,599.14	
Miscellaneous		28,272.51	
Field service		708,631.68	
			$2,292,570.40
Capital Requirements			
Towards buildings, equipment, or endowment			
Schools of hygiene and public health		$690,210.42	
Schools of nursing		198.34	
Central Medical School for Native Medical Students, Suva, Fiji		4,860.00	
			$695,268.76
DIVISION OF MEDICAL EDUCATION			
General Budget			
Medical education			
Medical schools		$214,637.97	
Peking Union Medical College (operation Nov. 1, 1927, to Sept. 30, 1928)		776,293.57	
Premedical schools		65,809.30	
Miscellaneous		52,356.79	
Schools of hygiene and public health		5,000.00	
Nursing education		153,486.27	
Aid to hospitals in China		30,756.21	
Hospital and dispensary service		62,966.61	
Human biology		206,268.12	

EXHIBIT B—*Continued*

DIVISION OF MEDICAL EDUCATION—*Continued*			
General Budget--*Continued*			
Medical Education—*Continued*			
Fellowships	$519,735.82		
Field service	79,962.89		
		$2,167,273.55	
Capital Requirements			
Towards buildings, equipment, or endowment			
Medical education			
Medical schools	$3,410,013.11		
Peking Union Medical College	343,451.41		
Premedical schools	3,550.66		
Schools of hygiene and public health	49,500.00		
Nursing education	72,469.01		
		$3,878,984.19	
			$9,690,738.52
Income on hand December 31, 1928, accounted for in balance sheet			$6,745,053.76

NOTE.—Income amounting to $444,846.32 was received on January 2, 1929. This is not included in the foregoing statement. The sum of $161,905.73, representing 1929 income received in 1928, is, of course, omitted from the statement.

1928 FOUNDATION APPROPRIATIONS
UNPAID BALANCES OF APPROPRIATIONS MADE IN PRIOR YEARS AND PAYMENTS THEREON MADE IN 1928

EXHIBIT C

CENTRAL ADMINISTRATION

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
GENERAL BUDGET			
Administration			
Executive offices			
(RF 21139, 21172, CA 21174, 21178, 21180, 21181, 28010)	$38,726.40	$510,710.00	$477,679.59
Paris office			
(CA 21018, 21170, 21175)	58,654.06	79,605.00	74,010.61
Paris office. Permanent improvements and fixtures (CA 21151)	12,000.00	.....	12,000.00
Peking office			
(CM 2775, 21176)	4,820.31	16,000.00	14,992.67
Treasurer's office			
(CA 21177, 21179, 28024, 28103)	6,282.28	21,710.11	21,206.00
Miscellaneous			
China emergency fund (CA 21169)	49,284.69	.....	36,042.00
Special studies by divisional committees (CA 28025)	.....	10,000.00	468.73
Memorials for Dr. Adrian Stokes (CA 28011)	.....	20,500.00	20,197.07
Rotating funds for Foundation's various offices (RF 2824)	5,000.00	.....	.....
Fellowships: Contingent fund			
For sick care and special emergencies in connection with holders of direct fellowships (RF 21041, 21162)	1,693.95	.....	44.95

EXHIBIT C—*Continued*

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
General Budget—*Continued*			
Miscellaneous—*Continued*			
War Relief Commission. Administration 1917 (RF 2216)	$644.75	$.....	$.....
Special payment in connection with Brazilian nurse (CA 28379)	.....	2,500.00	.....
	$177,106.44	$661,025.11	$656,641.62
Unexpended balances of appropriations allowed to lapse	65,979.98	.....	.....
TOTALS: GENERAL BUDGET	$111,126.46	$661,025.11	$656,641.62
CAPITAL REQUIREMENTS			
China Medical Board, Incorporated. Endowment[1] (CA 28120 A)	.....	12,000,000.00	12,000,000.00
Peking office			
Building and land (CM 2671)	7,190.75	.....	.....
TOTALS: CENTRAL ADMINISTRATION	$118,317.21	$12,661,025.11	$12,656,641.62

[1] Paid from principal.

1928 FOUNDATION APPROPRIATIONS
UNPAID BALANCES OF APPROPRIATIONS MADE IN PRIOR YEARS AND PAYMENTS THEREON MADE IN 1928

EXHIBIT D

DIVISION OF MEDICAL EDUCATION

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
GENERAL BUDGET			
Medical Schools			
Brazil			
Faculty of Medicine, São Paulo			
Laboratory aid: scientific equipment and supplies (ME 21092)	$4,103.55	$5,000.00	$.....
Canada			
Dalhousie University			
Additional teaching staff (ME 21173)	.....	5,000.00	2,000.00
China			
Hsiang-Ya Medical College (Changsha). Maintenance (CM 2754)	53,398.22	48,000.00	.....
St. John's University			
Expenses in connection with transfer of students from Hsiang-Ya Medical College during year 1927–28, $20,000 Mex. (ME 21186) Balance	7,423.49	.....	4,574.63
Shanghai Union Medical College			
In recognition of services in completing the education of former Hunan-Yale students (ME 28067)	.....	6,000.00	.....
Shantung Christian University. Maintenance (CM 2694, ME 21220)	42,931.21	27,000.00	23,128.00

EXHIBIT D—*Continued*

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
GENERAL BUDGET—*Continued*			
Medical Schools—*Continued*			
China—*Continued*			
Emergency fund			
For aid of medical work in China at the discretion of the associate director (CM 2771, ME 21221)	$508.76	$7,500.00	$376.13
Great Britain			
University of Edinburgh			
Towards development of clinical teaching in its medical school (ME 21056, 21085)	9,006.01	8,000.00	7,710.50
Europe			
Medical literature aid			
Supplying medical journals to medical institutions in Europe (ME 2973, 21089, 21153, 28385)	5,668.16	25,050.00	19,855.35
Laboratory aid			
Equipment and supplies (ME 2862, 2974, 21206, 21091)	106,712.40	25,000.00	23,731.14
Developmental aid			
Constructive program of aid to medical education without capital expenditure (ME 2977, 21094, 21207)	47,009.93	50,000.00	54,396.86
Emergency program			
Resident fellows (and scholars) in Germany (ME 2975, 21090)	21,579.20	.....	16,115.08
Emergency assistance to laboratories (ME 2725)	36,885.29	.....	.....
Siam			
Chulalongkorn University			
Towards salaries and travel of foreign professors (ME 21077, 21086, 28039)	8,114.53	25,000.00	22,518.40

Library aid (ME 21148)	$1,775.09	$.....	$258.89
Laboratory aid (equipment and supplies for medical and pre-medical schools) (ME 21093)	4,676.58	5,000.00	Cr. 27.01
Syria			
American University of Beirut			
Maintenance and equipment (ME 21088)	.....	35,000.00	35,000.00
Support of health center (ME 21187)	.....	5,000.00	5,000.00
Peking Union Medical College			
Maintenance in China			
Year 1926–27 (CM 2760)	115,637.23	.....	.....
Year 1927–28 (ME 21180, 21222)	205,567.53	440,000.00	531,726.04
Year 1928–29 (ME 28041)	.....	430,000.00	209,353.05
Expenses in the United States (CM 2773, ME 21251, 21223, 28042)	5,003.07	75,000.00	28,460.31
Special field study in anthropology (CM 2778, 28035)	7,775.46	2,200.00	4,089.67
Field studies in kala-azar (CM 2733)	4,212.88	.....	2,720.99
Diet investigation (CM 2539)	981.09	.....	.....
Insurance on buildings (CM 2684)	334.07	.....	Cr. 56.49
Honor scholarships (ME 21224)	.....	1,000.00	.....
Student loan fund (CM 2758)	1,200.00	.....	.....
Premedical Schools			
China			
Central National University. Maintenance (CM 2720, 2762)	5,332.38	2,640.00	.....
Fukien Christian University. (Maintenance (CM 2274–76)	20,717.41	.....	11,400.00
Ginling College. Maintenance (CM 2721)	6,600.00	1,100.00	5,577.28
Lingnan University. Maintenance (CM 2761)	6,855.00	4,400.00	.....
Nankai University. Maintenance (CM 2734)	3,558.93	2,290.00	4,341.00
St. John's University. Maintenance (CM 2679)	4,211.25	1,200.00	1,905.00
Shanghai College. Maintenance (CM 2688)	3,783.75	1,100.00	3,150.00
Shantung Christian University. Support of additional staff (CM 2729)	10,800.00	3,600.00	5,842.69

EXHIBIT D—*Continued*

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
GENERAL BUDGET—*Continued*			
Premedical Schools—*Continued*			
China—*Continued*			
Soochow University. Maintenance (CM 2674)	$6,575.00	$1,150.00	$5,690.00
Tsing Hua College. Maintenance (CM 2749)	600.00	600.00	469.24
Yenching (Peking) University. Maintenance (CM 2717)	19,485.36	16,370.00	13,567.82
Siam			
Chulalongkorn University			
Salary and travel of visiting professors (ME 21078, 21087, 28039)	2,647.56	18,000.00	13,866.27
Miscellaneous. Medical Education			
Association of American Medical Colleges (Commission on Medical Education)			
Towards study of the medical curriculum in America (ME 21101)	.....	10,000.00	10,000.00
American Medical Association			
Towards loss in publishing a Spanish edition of its Journal (ME 21099, 21100)	.....	15,000.00	5,450.23
China Medical Association			
Towards current expenses (CM 2770)	1,346.62	6,000.00	4,578.76
Chulalongkorn University			
Travel of delegates to a congress of the Far Eastern Association of Tropical Medicine in Calcutta (ME 21202)	800.52	.....	669.68
National Medical Association of China			
Towards current expenses (ME 28068)	.....	1,100.00	924.50
Travel of visiting scientists (ME 21095, 21208)	4,520.38	15,000.00	6,529.63
Bulletins and reprints (ME 21200, 28075)	5,238.81	19,000.00	24,203.99
Purchase and distribution of physiology textbook (ME 28093)	.....	1,000.00	.....

Schools of Hygiene and Public Health			
Philippine Islands			
University of the Philippines, Graduate School of Sanitation and Public Health			
Equipment, supplies, and journals (ME 28090)	$.....	$10,000.00	$.....
Salary and travel of two visiting professors (ME 28091)	.....	37,200.00	.....
Yugoslavia			
University of Zagreb, Department of Hygiene			
Equipment and maintenance (ME 21198)	5,000.00	10,000.00	5,000.00
Field training in hygiene (ME 28092)	.....	10,000.00	.....
Nursing Education			
France			
Aid to nursing centers at Paris, Lyon, and Nancy (ME 2987, 21119)	5,965.47	.....	3,493.87
Maintenance of training center at Secrétan Dispensary (ME 2988, 21122)	10,587.26	.....	3,492.51
University of Lyon. Towards maintenance of health center for the field training of nurses (ME 28027)	.....	12,000.00	.....
Hungary			
State Central School of Nursing, Budapest. Maintenance (ME 21120)	10,000.00	.....	.....
School of Nursing, University of Debreczen. Maintenance (ME 21197)	2,000.00	2,000.00	.....
Japan			
St. Luke's International Hospital, Tokyo			
For educational features of the College of Nursing (ME 21129)	.....	10,000.00	10,000.00
Poland			
University of Cracow, School of Public Health and Bedside Nursing			
Balance of $35,000 for salaries and scholarships during 5-year period ending December 31, 1929 (ME 2927)	25,371.18	.....	6,723.17

EXHIBIT D—*Continued*

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
GENERAL BUDGET—*Continued*			
Nursing Education—*Continued*			
Siam			
School of Nursing, Siriraj Hospital, Bangkok			
Travel and supplementary salaries (ME 21128, 28039)	$27.20	$11,000.00	$10,964.31
Scientific books and equipment (ME 21059)	536.91	.....	254.88
Yugoslavia			
Belgrade School of Nursing			
Resident scholarships and development of teaching facilities (ME 2908)	1,089.37	.....	.....
School of Public Health and Bedside Nursing, Zagreb			
Balance of $5,250 for scholarships and salary of an assistant during a 3-year period ending Dec. 31, 1927 (ME 2913)	1,765.54	.....	.....
United States			
D. Ogden Mills Training School for Nurses			
Maintenance (ME 21126)	.....	4,000.00	4,000.00
George Peabody College for Teachers			
Education in public health nursing (ME 21125)	.....	8,000.00	8,000.00
Vanderbilt University			
Educational features of school of nursing (ME 21123)	.....	20,000.00	20,000.00
Nurse training courses (ME 21043, 21124)	14,000.00	7,000.00	12,083.33
Yale University School of Nursing. Maintenance of educational features (ME 21225)	.....	42,500.00	42,500.00
Equipment, supplies, incidentals (ME 2721, 21174)	39,844.44	.....	18,664.39
Study visits to Yale University School of Nursing and other institutions by nurse teachers and directors in the United States and Canada (ME 28104)	.....	25,000.00	5,240.07

Committee on Grading of Nursing Schools			
General expenses (ME 21226)	$.....	$5,000.00	$5,000.00
Travel of visiting nurses in United States, Canada, and Europe (ME 2994, 2995, 21131, 21183, 21210)	5,338.98	11,000.00	3,069.74
Aid to Hospitals in China			
American Baptist Foreign Mission Society			
Ningpo. Support of additional staff (CM 276)	11,250.00	.....	3,000.00
Shaohsing. Support of additional staff (CM 277)	6,000.00	.....	.....
American Baptist Foreign Mission Society and the Board of Missions of the Methodist Episcopal Church, South, jointly			
Huchow. Maintenance (CM 2752)	1,500.00	1,200.00	1,500.00
American Board of Commissioners for Foreign Missions			
Fenchow. Maintenance (CM 2757)	5,600.00	1,000.00	.....
Tehchow. Maintenance (CM 2571, 2784)	4,810.50	2,000.00	2,144.83
Board of Foreign Missions of the Methodist Episcopal Church			
Peking. Maintenance (CM 2675)	3,000.00	.....	.....
Wuhu. Maintenance (CM 2718)	4,650.00	2,825.00	4,004.68
Board of Missions of the Methodist Episcopal Church, South			
Soochow. Maintenance (CM 2764)	4,400.00	3,300.00	.....
Board of Foreign Missions of the Presbyterian Church in the United States			
Changteh. Maintenance (CM 2604, 2781)	7,500.00	3,000.00	2,750.00
Chefoo. Maintenance (CM 2603, 2780)	7,500.00	3,000.00	3,750.00
Hwaiyuen. Maintenance (CM 2699)	6,375.00	2,400.00	1,772.72
Paotingfu. Maintenance (CM 2572, 2779)	9,187.50	3,000.00	4,687.50
Church of Scotland Foreign Mission Committee			
Ichang. Support of additional staff (CM 289)	7,500.00	.....	.....
Maintenance (CM 2719)	1,150.00	425.00	.....
Domestic and Foreign Missionary Society of the Protestant Episcopal Church in the United States			
Anking. Maintenance (CM 2701)	1,000.00	1,000.00	.....

EXHIBIT D—*Continued*

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
GENERAL BUDGET—*Continued*			
Aid to Hospitals in China—*Continued*			
Foreign Mission Board of the Southern Baptist Convention			
Yangchow Hospital. Maintenance (CM 2765)	$1,040.00	$550.00	$.....
Methodist Women's Hospital in Peking			
Nurses Training School			
Support of additional staff (CM 2678, 2786)	623.67	533.33	439.62
Nanking Union Hospital. Maintenance (CM 2575, 2763)	4,820.64	6,600.00	.....
United Christian Missionary Society			
Luchowfu. Maintenance (CM 2637, 2785)	13,500.00	3,300.00	5,598.12
Nantungchow. Maintenance (CM 2218)	8,400.00	.....	1,108.74
Loss in exchange			
To cover loss in exchange of payments to mission institutions under appropriations (CM 2503)	15,000.00	.....	.....
Hospital and Dispensary Development			
Committee on Dispensary Development			
Towards expenses of committee (CM 2996)	12,046.24	.....	6,977.77
United Hospital Fund			
For transferring to permanent agencies activities of the Committee on Dispensary Development (ME 21227)	.....	27,250.00	27,250.00
American Conference on Hospital Service			
Maintenance (ME 21178, 28034)	3,000.00	5,000.00	8,000.00
Research and teaching in hospitals and clinic service			
Maintenance (ME 21201, 21211)	2,578.01	25,000.00	20,738.84
Human Biology			
Mental hygiene			
National Committee for Mental Hygiene			
General expenses (ME 21106)	.....	5,000.00	5,000.00

Surveys in the care and treatment of mental diseases (ME 21105)	$4,635.14	$10,000.00	$9,712.06
Canadian National Committee for Mental Hygiene			
Studies in the application of mental hygiene to school children (ME 21108)	.....	15,000.00	15,000.00
National Research Council			
Biological Abstracts			
Support of editorial service (ME 21110, 21228)	8,408.11	68,000.00	57,078.74
Australian National Research Council			
Anthropological studies in Australian universities (ME 21111, 21229)	7,970.99	20,000.00	18,451.08
Salary and travel of visiting professors or special investigators on anthropological problems (ME 21203)	10,000.00	10,000.00	7,577.97
Anthropological studies in Central Asia in cooperation with the Geological Survey of the Chinese Government (ME 28066)	.....	15,000.00	.....
The Johns Hopkins University			
Biological research (ME 21230)	.....	47,000.00	47,000.00
Yale University			
Promotion of anthropoid research (ME 21114)	.....	10,000.00	10,000.00
University of Hawaii			
Support of departments for study of biological, mental, and social conditions of people of Hawaii (ME 21231)	.....	20,000.00	20,000.00
Bernice P. Bishop Museum, Honolulu			
Research in Polynesian anthropology (ME 21116)	1,300.00	10,000.00	8,700.00
Tohoku Imperial University, Sendai, Japan			
Salary and expenses of visiting professors (ME 21167)	6,250.00	12,500.00	7,748.27
Keiogijuku University, Tokyo, Japan			
Salary and expenses of visiting professors (ME 21168)	6,250.00	12,500.00	.....
Equipment and supplies for projects in human biology (ME 21081)	955.98	.....	.....
Surveys (ME 21133)	16,342.96	.....	.....

EXHIBIT D—*Continued*

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
GENERAL BUDGET			
Fellowships			
Medical education			
Foreign, exclusive of China (ME 2979, 21097, 21212)	$73,364.31	$200,000.00	$165,795.98
Foreign, China (CM 2767, ME 21213)	28,885.54	60,000.00	47,668.19
For study at the Peking Union Medical College			
Chinese students (CM 2769, ME 21215)	4,951.90	8,250.00	3,220.72
Foreign students (CM 2768, ME 21177, 21214)	5,596.70	8,250.00	2,777.68
National Research Council			
Research fellowships in medicine (prior to 1928 supported jointly by the Foundation and General Education Board) (ME 2980, 21098, 21232)	24,509.18	50,000.00	50,000.58
Medical Research Council, Great Britain			
Fellowships in medicine in the United States (ME 21046)	21,327.89	.....	11,376.43
Resident fellowships in Europe (ME 2976)	17,481.82	.....	.....
Notgemeinschaft der Deutschen Wissenschaft, Germany			
Traveling fellowships (ME 21181)	7,500.00	15,000.00	8,436.77
Nursing education (ME 21192, 21216)	33,076.00	60,000.00	32,450.07
Human biology			
Administered by the Foundation (ME 21185, 21217)	14,429.42	20,000.00	8,811.39
National Research Council			
Support of biological fellowships (ME 21109, 21233)	1,907.33	75,000.00	66,647.24
National Committee for Mental Hygiene			
Fellowships in mental hygiene (ME 21107)	4,265.04	15,000.00	13,461.01
Australian National Research Council			
Fellowships in anthropology and related subjects in Australia and New Zealand (ME 21184)	15,000.00	.....	3,672.97

Physics, chemistry, and mathematics			
National Research Council (ME 21118, 21234)	$6,647.99	$ 125,000.00	$105,416.79
Field Service			
Salaries and expenses of divisional staff (ME 21017, 21019, 21171, 21218)	25,818.06	88,700.00	79,962.89
Surveys by others than officers (ME 21219)	.....	2,000.00	.....
	$1,404,408.99	$2,642,583.33	
Unexpended balances of appropriations allowed to lapse	472,629.05	83,121.79	
TOTALS: GENERAL BUDGET	$931,779.94	$2,559,461.54	$2,167,273.55
CAPITAL REQUIREMENTS			
Medical Education			
Belgium			
Free University of Brussels			
Towards building and equipment of the new university institutes (ME 21159, 21235)	$146,419.02	$292,000.00	$422,436.94
Endowment of medical school (ME 28038)	.....	1,140,000.00	1,116,800.00
Brazil			
Faculty of Medicine, São Paulo			
Towards buildings for laboratories of anatomy, physiology, chemistry, and pathology (ME 21065, 21239–40)	350,000.00	400,000.00	732,818.42
Canada			
University of Montreal, Faculty of Medicine			
Development of laboratories (ME 21182, 21236)	25,000.00	25,000.00	25,000.00
England			
University of Cambridge			
Towards endowment of School of Pathology (ME 21103)	.....	25,000.00	22,368.94

EXHIBIT D—*Continued*

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
CAPITAL REQUIREMENTS—*Continued*			
Medical Education—*Continued*			
France			
University of Lyon			
Interest on endowment (ME 21252)	$635.00	$4,000.00	$.....
Towards land and building for Faculty of Medicine and Pharmacy (ME 21242)	.....	1,000,000.00	269,581.73
University of Strasbourg			
Towards development of Medical School (ME 21165)	13,077.70	.....	3,936.88
Germany			
Institute for Psychiatric Research, Munich			
Towards erection of building (ME 21241)	.....	75,000.00	75,000.00
Haiti			
National School of Medicine and Pharmacy, Port au Prince			
For teaching equipment (ME 21164)	30,000.00	.....	15,000.00
Japan			
Keio University College of Medicine			
Towards building and equipment of the reorganized department of preventive medicine (ME 21243)	.....	100,000.00	100,000.00
Siam			
Chulalongkorn University			
Medical school buildings (ME 2819, 21149)	6,336.75	.....	4,570.20
Syria			
American University of Beirut			
Towards building and equipment of Medical School (ME 21244)	.....	250,000.00	.....

United States			
New York Academy of Medicine			
Interest on endowment (ME 21238)	$.....	$37,500.00	$37,500.00
Endowment (ME 21237)	.....	500,000.00	500,000.00
Towards purchase of the Streeter Collection of incunabula and medical classics (ME 28026)	.....	85,000.00	85,000.00
China			
Peking Union Medical College			
Original construction program			
Purchase of land (CM 2381)	799.60	.....	.....
Building and fixed equipment (CM 2646)	15,401.27	.....	1,449.74
Library (CM 2624)	417.23	.....	129.89
Movable equipment (CM 2614)	1,170.34	.....	238.14
Accessories (CM 2529)	10,328.84	.....	Cr. 1,081.62
Second construction program			
Buildings and fixed equipment (CM 2782, ME 21245)	302,761.58	203,500.00	329,393.15
Movable equipment (CM 2746, ME 21246)	6,349.33	31,500.00	5,287.26
Accessories (CM 2783, ME 21247)	3,394.99	16,000.00	261.19
Fundamental repairs, alterations, additions, and improvements to the buildings and equipment (ME 21172, 21249)	4,984.09	10,000.00	7,773.66
Shanghai Union Medical College			
Purchase of land (CM 2269)	2,031.65	.....	.....
Shantung Christian University			
Loss in exchange on remittances for capital expenditure (CM 2693)	30,000.00	.....	.....
Schools of Hygiene and Public Health			
All-India School of Hygiene and Public Health			
Buildings and equipment (ME 28381)	.....	350,000.00	.....
Harvard University. School of Public Health			
Interest on endowment (ME 21250)	.....	49,500.00	49,500.00

EXHIBIT D—*Continued*

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
CAPITAL REQUIREMENTS—*Continued*			
Schools of Hygiene and Public Health—*Continued*			
University Institute of Hygiene, Faculty of Medicine, Nancy, France			
Building improvements (ME 28019)	$.....	$25,000.00	$.....
Premedical Schools			
Central National University			
Towards construction and equipment of science building (CM 2587)	21,576.00	.....	.....
Nanking University			
Equipment of science departments (CM 2681)	5,000.00	.....	3,550.66
Shantung Christian University			
Additional equipment and alteration for science buildings (CM 2727)	4,777.38	.....	.....
Scientific equipment (CM 2588)	15,000.00	.....	.....
Tsing Hua College			
Equipment $5,000 Mex. (CM 2750)	1,768.58	.....	.....
Nursing Education			
England			
St. Thomas's Hospital, London			
Erection and equipment of diet kitchen (ME 21154)	10,000.00	.....	.....
Nurses' School and Home of the University College Hospital, London. Buildings and equipment (ME 28040)	.....	50,000.00	50,000.00
Hungary			
Budapest School of Nursing			
Alterations and equipment (ME 21008)	10,000.00	.....	.....

State Central School of Nursing, Budapest			
Building and equipment (ME 28088)	$.....	$25,000.00	$.....
School of Nursing, University of Debreczen			
Building, equipment, and furnishings (ME 21195, 21196)	9,443.41	.....	.....
Poland			
University of Cracow, School of Public Health and Bedside Nursing			
Buildings and equipment (ME 2833)	40,428.59	.....	.....
State School of Nursing, Warsaw			
Buildings and equipment (ME 21166)	100,000.00	.....	22,426.05
Yugoslavia			
School of Public Health and Bedside Nursing, Zagreb			
Building and equipment (ME 2832)	42.96	.....	42.96
Hospitals in China			
Board of Foreign Missions of the Methodist Episcopal Church			
Wuhu. Building and equipment (CM 2499)	4,726.61	.....	.....
	$1,171,870.92	$1,694,000.00	
Unexpended balances of appropriations allowed to lapse	20,590.16	39,182.08	
TOTALS: CAPITAL REQUIREMENTS	$1,151,280.76	$4,654,817.92	$3,878,984.19
TOTALS: DIVISION OF MEDICAL EDUCATION	$2,083,060.70	$7,214,279.46	$6,046,257.74

1928 ROCKEFELLER FOUNDATION APPROPRIATIONS
UNPAID BALANCES OF APPROPRIATIONS MADE IN PRIOR YEARS AND PAYMENTS THEREON MADE IN 1928

EXHIBIT E

INTERNATIONAL HEALTH DIVISION

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
GENERAL BUDGET			
Hookworm Work			
Mexico			
1927 (IH 23171–74, 23424)	$6,450.63	$.....	$585.34
Central America			
Guatemala			
1927 (IH 23175)	1,593.12	.....	216.16
1928 (IH 23851)	.....	2,257.50	1,740.80
Panama			
1927 (IH 23176, 23505)	5,246.87	.....	970.60
1928 (IH 23863)	.....	6,954.00	4,191.67
South America			
Colombia			
1927 (IH 23181–83)	8,278.04	.....	3,040.99
1928 (IH 23658)	.....	22,500.00	12,125.21
Paraguay			
1927 (IH 23184)	8,203.21	.....	2,640.19
1928 (IH 23660)	.....	9,000.00	4,125.40
Venezuela			
1927 (IH 23387)	3,522.64	.....	568.44
1928 (IH 23661)	.....	1,820.00	581.72

West Indies			
Jamaica			
1927 (IH 23177–79)	$2,083.25	$.....	$1,556.74
1928 (IH 23616–18)	.....	6,452.00	5,566.21
Porto Rico			
1927 (IH 23180)	2,561.86	.....	445.58
1928 (IH 23622, 28117)	.....	9,450.00	5,841.45
The East			
India			
1927 (IH 23185–86)	4,957.39	.....	1,545.79
1928 (IH 23682–83, 28016–17)	.....	5,347.00	3,919.78
Java			
1927 (IH 23187)	8,549.04	.....	2,520.53
Sarawak			
1927 (IH 23566)	557.01	.....	141.43
Siam			
1927 (IH 23188–89, 23504)	2,506.63	.....	1,211.63
1928 (IH 23685)	.....	5,200.00	5,130.20
South Pacific Islands			
1927 (IH 23447)	128.49	.....	128.49
Straits Settlements			
1927 (IH 23190)	2,159.69	.....	1,414.27
1928 (IH 23687, 28434)	.....	7,360.00	4,074.63
Europe			
Spain			
1926 (IH 23024, 23081)	1,166.00	.....	.....
1927 (IH 23191)	750.19	.....	417.58
1928 (IH 23671, 28003)	.....	3,930.00	1,782.04
Field Studies			
Alabama			
1927 (IH 23402)	4,392.06	.....	2,231.52
1928 (IH 23880, 28083)	.....	7,000.00	2,609.38

EXHIBIT E—*Continued*

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
GENERAL BUDGET—*Continued*			
Hookworm Work—*Continued*			
Field Studies—*Continued*			
Studies by Dr. W. W. Cort			
1927 (IH 23191)	$2,410.15	$.....	$2,336.33
1928 (IH 23688)	.....	7,500.00	5,316.96
Vanderbilt University, Nashville, Tenn.			
Research in carbon tetrachloride			
1927 (IH 23448)	5,803.01	.....	3,731.97
1928 (IH 28004)	.....	20,000.00	17,317.62
Egypt			
1927 (IH 23490)	1,046.48	.....	283.27
Miscellaneous			
Motion picture film on hookworm disease (IH 22493, 23193, 23836)	1,825.44	500.00	64.11
County Health Work			
United States			
Alabama			
1927 (IH 23388)	2,787.07	.....	1,968.64
1928 (IH 23844–45)	.....	16,100.00	1,472.00
Arkansas			
1925–27 (IH 23028, 23111–12, 23227–29, 23598, 23806–07)	3,850.00	.....	3,273.78
1928 (IH 23690–92)	.....	1,800.00	463.35
California			
1927 (IH 23230–32, 23452, 23548–49, 23596–97)	2,749.99	.....	1,375.00
1928 (IH 23693–97, 28081)	.....	12,000.00	3,750.00
Colorado			
1927 (IH 23233)	500.00	.....	500.00
1928 (IH 23698)	.....	2,000.00	1,500.00

Georgia			
1927 (IH 23234)	$2,069.72	$.....	$2,030.75
1928 (IH 23699, 23701, 28079–80)	.....	6,933.33	4,029.33
Iowa			
1927 (IH 23235, 23524)	825.00	.....	825.00
1928 (IH 23710)	.....	3,300.00	2,475.00
Kansas			
1927 (IH 23236–38, 23547)	636.72	.....	636.72
1928 (IH 23712, 28006, 28049, 28071, 28098, 28114)	.....	2,708.35	1,614.58
Kentucky			
1927 (IH 23239–46, 23493, 23512, 23574, 23579, 23580–83)	5,315.32	.....	4,016.04
1928 (IH 23713–22)	.....	13,200.00	8,816.87
Louisiana			
1927 (IH 23247–50, 23494)	4,087.82	.....	2,094.18
1928 (IH 23881–84)	.....	8,000.00	340.98
Michigan			
1928 (IH 23888–89, 28378)	.....	6,812.50	4,706.05
Mississippi			
1927 (IH 23251–57, 23418, 23453, 23599)	6,915.17	.....	3,860.42
1928 (IH 23724–30, 23890–91)	.....	19,250.00	4,620.63
Missouri			
1927 (IH 23258–61, 23511)	3,127.46	.....	1,522.46
1928 (IH 23739–41, 28084)	.....	5,720.00	3,139.58
Montana			
1928 (IH 28014)	.....	1,400.00	487.50
New Mexico			
1927 (IH 23262–66, 23564)	3,685.91	.....	864.98
1928 (IH 23744–45, 28072)	.....	2,880.00	1,991.91
North Carolina			
1927 (IH 23419)	3,269.53	.....	3,269.53
Oklahoma			
1927 (IH 23267–74, 23539–46)	3,547.03	.....	2,899.91
1928 (IH 23750–57, 23893, 28056–64)	.....	12,599.98	9,470.80

EXHIBIT E—*Continued*

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
GENERAL BUDGET—*Continued*			
County Health Work—*Continued*			
United States—*Continued*			
Oregon			
1927 (IH 23275–80, 23550–54)	$3,739.52	$.....	$2,191.93
1928 (IH 23758–65)	.....	10,550.00	4,675.01
South Carolina			
1927 (IH 23281–86, 23420, 23479, 23499)	9,109.37	.....	2,652.23
1928 (IH 23766–72, 28102)	.....	14,358.94	6,981.71
South Dakota			
1927 (IH 23287, 23454)	5,312.53	.....	1,077.80
1928 (IH 23894)	.....	1,750.00	1,260.73
Tennessee			
1927 (IH 23430–41, 23530–31)	4,300.20	.....	3,210.02
1928 (IH 23784–94, 28065, 28069, 28099)	.....	19,945.83	10,962.28
Texas			
1927 (IH 23288–90, 23584–85)	2,288.05	.....	800.00
1928 (IH 23800–01)	.....	1,150.00	925.00
Utah			
1925–27 (IH 22441–42, 22990–92, 23136, 23161, 23169)	11,250.00	.....	.....
1928 (IH 23802–05)	.....	5,500.00	.....
Virginia			
1927 (IH 23296–300, 23455, 23480, 23500)	4,529.02	.....	3,941.34
1928 (IH 23808–13, 28032)	.....	16,725.00	8,441.61
West Virginia			
1927 (IH 23301–09, 23535–38, 23592–94)	9,823.89	.....	4,944.77
1928 (IH 23818–27, 28085)	.....	20,975.00	11,782.55

Wyoming			
1927 (IH 23310)	$357.75	$	$214 55
1928 (IH 23828)		1,000.00	673.98
Mississippi flood area			
Balance of $500,000 appropriated for county health work in Mississippi flood area (IH 23521)	180,543.25		
Funds allotted under (IH 23521)			
Arkansas 1927–28	68,374.03		34,210.09
Illinois 1927–28	5,000.00		1,555.52
Kentucky 1927–28	30,422.01		12,677.27
Louisiana 1927–28	77,210.00		25,908 63
Mississippi 1927–28	28,036.35		13,773 78
Missouri 1927–28	7,330 02		3,204 88
Tennessee 1927–28	3,363.52		2,492 80
Training Station 1927	15,388 50		6,341 54
Training Station 1928	41,750 00		20,671 91
Foreign countries			
Austria			
1927 (IH 23410)	4,201 69		4,136 98
1928 (IH 23860)		3,715 00	2,713 50
Brazil			
1927 (IH 23311–27, 23467, 23501, 23506–08, 23559–61)	24,188 26		8,224 72
1928 (IH 23635–39, 23641–54, 23656–57, 28033)		35,896 00	20,152 00
Bulgaria			
1927 (IH 23517)	3,300 00		1,503.83
1928 (IH 28130)		1,450.00	
Canada			
1926–27 (IH 23027, 23076, 23149, 23328–29, 23465, 23498, 23519, 23586–88, 23600–602)	19,962.57		15,855 66
1928 (IH 23606–15)		37,621.45	13,518 65

EXHIBIT E—*Continued*

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
GENERAL BUDGET—*Continued*			
County Health Work—*Continued*			
Foreign Countries—*Continued*			
Ceylon			
1927 (IH 23330)	$3,192.11	$.....	$36.21
1928 (IH 23680)	.....	370.00	126.14
Czechoslovakia			
1926–27 (IH 23138, 23487, 23556)	8,702.38	.....	4,318.76
1928 (IH 23858–59)	.....	8,525.00	.....
France			
1926–27 (IH 22966, 23061, 23080, 23086, 23382, 23411–13, 23469)	61,008.23	.....	30,782.77
1928 (IH 23865–69, 28094, 28401)	.....	27,200.00	2,003.55
Hungary			
1926–27 (IH 23065, 23461, 23558)	5,301.48	.....	500.00
1928 (IH 28013, 28077–78)	.....	6,580.00	1,000.00
Ireland			
1928 (IH 28043–44)	.....	8,600.00	.....
Jamaica			
1928 (IH 23621)	.....	900.00	202.96
Mexico			
1928 (IH 23897)	.....	2,445.00	1,786.31
Philippine Islands			
1927 (IH 23509)	500.00	.....	50.02
Poland			
1926–27 (IH 22967–68, 23147, 23414–16, 23470–71)	28,903.35	.....	13,068.37
1928 (IH 23873–76)	.....	21,300.00	1,900.01

Porto Rico			
1927 (IH 23331, 23417, 23485–87, 23520)	$1,931.42	$.....	$871.52
1928 (IH 23623–24, 28030, 28116)	.....	6,873.50	3,514.32
Siam			
1928 (IH 23686)	.....	1,400.00	751.21
Yugoslavia			
1928 (IH 23849)	.....	20,000.00	20,000.00
Malaria Work			
Surveys and demonstrations			
United States			
Alabama			
1927 (IH 23389–92, 23478, 23491)	4,821.61	.....	3,937.57
Georgia			
1927 (IH 23194)	1,865.97	.....	1,421.01
1928 (IH 23703–06)	.....	8,500.00	3,770.61
Louisiana			
1927 (IH 23195–97, 23403)	1,401.89	.....	893.93
1928 (IH 23885–86)	.....	2,900.00	634.41
Mississippi			
1927 (IH 23198–204, 23492)	4,621.42	.....	3,264.43
1928 (IH 23731–36, 28051–55)	.....	12,300.00	6,150.00
North Carolina			
1927 (IH 23204, 23405, 23449)	3,074.40	.....	850.00
South Carolina			
1927 (IH 23405–09, 23450)	3,295.29	.....	2,845.29
1928 (IH 23773–76, 23778–79)	.....	10,800.00	4,350.00
Tennessee			
1927 (IH 23425–29)	875.00	.....	808.34
1928 (IH 23795)	.....	1,500.00	1,125.00
Virginia			
1927 (IH 23205–10)	3,631.74	.....	1,902.10
1928 (IH 23814–17)	.....	9,500.00	3,683.74

EXHIBIT E—*Continued*

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
GENERAL BUDGET—*Continued*			
Malaria Work—*Continued*			
Surveys and demonstrations—*Continued*			
Foreign countries			
Argentina			
1927 (IH 23213-15, 23460, 23568)	$5,371.08	$.....	$2,217.24
1928 (IH 23626-29, 28118-19)	.....	15,480.00	9,064.90
Brazil			
1927 (IH 23212)	8,139.56	.....	3,202.11
1928 (IH 23631)	.....	11,200.00	9,022.12
Bulgaria			
1928 (IH 28015)	.....	8,100.00	5,118.92
Costa Rica			
1928 (IH 28101)	.....	1,200.00	.....
India			
1928 (IH 28046)	.....	940.00	.....
Italy			
1927 (IH 23216, 23476)	20,336.78	.....	14,564.52
1928 (IH 23669)	.....	111,000.00	61,925.57
Jamaica			
1928 (IH 23619)	.....	2,525.00	2,011.15
Palestine			
1927 (IH 23218)	620.53	.....	83.83
1928 (IH 23878)	.....	980.00	299.02
Philippine Islands			
1927 (IH 23380)	2,819.34	.....	579.18
1928 (IH 23853)	.....	5,000.00	2,367.30

Porto Rico			
1927 (IH 23211)	$247.42	$.....	$236.58
1928 (IH 23625)	.....	1,000.00	865.61
Spain			
1927 (IH 23217)	5,924.26	.....	4,074.08
1928 (IH 23672)	.....	7,280.00	5,489.99
Venezuela			
1927 (Listed under Hookworm Work)			
1928 (IH 23662)	.....	1,870.00	468.33
Field studies and experiments			
Alabama			
1927 (IH 23513)	503.33	.....	214.31
1928 (IH 28070)	.....	503.33	.....
North Carolina			
1926–27 (IH 23048, 23221)	22,254.03	.....	22,003.96
1928 (IH 23892)	.....	12,440.00	125.89
The Johns Hopkins University			
1927 (IH 23381, 23514)	414.54	.....	401.09
1928 (IH 23689, 28020)	.....	3,675.00	3,436.58
The Netherlands			
1927 (IH 23486)	5,228.04	.....	4,320.24
1928 (IH 28023)	.....	8,000.00	5,911.68
University of Chicago			
1927 (IH 23320)	279.61	.....	276.49
1928 (IH 23854)	.....	1,250.00	1,250.00
Miscellaneous (IH 22948)	438.30	.....	.....
Training of malaria personnel			
France			
1927 (IH 23219)	16,365.55	.....	5,213.87
1928 (IH 23859)	.....	7,800.00	40.27
Italy			
1928 (IH 23872)	.....	6,300.00	3,853.74

EXHIBIT E—*Continued*

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
GENERAL BUDGET—*Continued*			
Malaria Work—*Continued*			
Miscellaneous			
Motion picture on malaria (IH 23477)	$500.00	$.....	$.....
Yellow Fever Work			
Brazil			
1927 (IH 23222, 23475, 23522)	138,007.16	.....	16,404.90
1928 (IH 23632)	.....	101,250.00	63,044.26
Mexico and Central America			
1925 (IH 22485, 22498)	5,815.58	.....	5,787.99
1926 (IH 22801)	18.74	.....	18.74
West Africa			
1927 (IH 23223, 23899, 23604)	43,580.80	.....	41,412.99
1928 (IH 23679, 28028, 28045)	.....	170,000.00	134,589.80
Training of personnel			
1927 (IH 23224)	6,308.67	.....	780.32
1928 (IH 23837, 28045)	.....	20,000.00	11,172.69
Vaccine and serum			
1927 (IH 23225)	2,991.99	.....	1,134.88
1928 (IH 23838)	.....	7,000.00	2,141.08
History of yellow fever			
1927 (IH 23226)	1,107.00	.....	Cr. 66.40
1928 (IH 23839)	.....	2,250.00	2,005.00
State Health Services			
Epidemiology			
United States			
Alabama			
1927 (IH 23394)	3,302.16	.....	2,779.93

Georgia			
1928 (IH 23707)	$.....	$4,000.00	$.....
Kansas			
1927 (IH 23340)	371.04	.....	.....
Kentucky			
1927 (IH 23341, 23575)	2,791.67	.....	.....
1928 (IH 23723)	.....	3,500.00	969.24
Louisiana			
1927 (IH 23342, 23446)	2,700.00	.....	1,930.25
1928 (IH 23887)	.....	2,700.00	.....
Mississippi			
1927 (IH 23343)	858.75	.....	821.25
1928 (IH 23737, 28050)	.....	3,600.00	1,490.92
Missouri			
1927 (IH 23344)	3,300.00	.....	.....
Montana			
1927 (IH 23525)	1,825.00	.....	.....
1928 (IH 23743)	.....	3,650.00	425.20
North Carolina			
1928 (IH 23747)	.....	3,543.75	.....
North Dakota			
1928 (IH 28073)	.....	1,350.00	350.00
Rhode Island			
1927 (IH 23458)	111.31	.....	65.89
South Carolina			
1927 (IH 23345, 23523)	193.75	.....	193.75
1928 (IH 23780)	.....	3,175.00	2,381.25
South Dakota			
1927 (IH 23346, 23528)	2,477.21	.....	769.53
1928 (IH 23895)	.....	2,700.00	.....
Tennessee			
1927 (IH 23445, 23573)	684.27	.....	562.50
1928 (IH 23796)	.....	2,250.00	1,752.70

EXHIBIT E—*Continued*

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
GENERAL BUDGET—*Continued*			
State Health Services—*Continued*			
Epidemiology—*Continued*			
United States—*Continued*			
Utah			
1925-27 (IH 22466, 22667, 23014, 23347, 23533)	$6,982.35	$.....	$.....
1928 (IH 23806)	.....	3,000.00	.....
Conference of epidemiologists (IH 23489)	2,659.51	.....	.....
Foreign countries			
Denmark			
1927 (IH 23348, 23457)	1,627.70	.....	1,608.22
1928 (IH 23663, 23898)	.....	5,400.00	3,536.47
Spain			
1928 (IH 23673)	.....	5,980.00	.....
Sanitary Engineering			
United States			
Alabama			
1927 (IH 23395)	976.49	.....	878.11
Idaho			
1927 (IH 23352, 23525)	34.17	.....	34.17
1928 (IH 23709)	.....	1,600.00	1,418.39
Indiana			
1928 (IH 28005)	.....	3,050.00	.....
Iowa			
1927 (IH 23422)	174.99	.....	174.99
Maryland			
1927 (IH 23385)	2,200.00	.....	.....

North Dakota			
1928 (IH 28074)	$.....	$750.00	$191.67
Oregon			
1927 (IH 23354)	166.90	.....	.....
South Carolina			
1928 (IH 23781)	.....	3,350.00	2,512.50
Field Studies			
Field research on bored-hole latrine (IH 28113)	.....	1,050.00	392.40
Vital Statistics			
United States			
Alabama			
1927 (IH 23396)	780.00	.....	757.50
Arkansas			
1926-27 (IH 23017, 23349)	2,100.00	.....	2,100.00
Georgia			
1928 (IH 23708)	.....	1,200.00	900.00
Mississippi			
1927 (IH 23459)	843.52	.....	798.49
1928 (IH 23738)	.....	2,250.00	902.73
New Mexico			
1928 (IH 28096)	.....	1,200.00	.....
Oklahoma			
1927 (IH 23603)	500.00	.....	.....
South Carolina			
1927 (IH 23900)	290.00	.....	290.00
1928 (IH 28048)	.....	1,250 00	1,250.00
Tennessee			
1927 (IH 23444, 23481)	500.00	.....	.....
1928 (IH 23797)	.....	1,000.00	400.00
Texas			
1928 (IH 23862)	.....	3,450.00	.....

EXHIBIT E—*Continued*

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
GENERAL BUDGET—*Continued*			
State Health Services—*Continued*			
Vital Statistics—*Continued*			
Foreign countries			
Bulgaria			
1927 (IH 23557)	$1,235.00	$.....	$1,139.50
Colombia			
1927 (IH 23563)	232.27	.....	215.94
Denmark			
1926 (IH 23039)	38.81	.....	.....
1927 (IH 23456)	830.91	.....	815.50
1928 (IH 23664)	.....	1,620.00	947.53
Yugoslavia			
1928 (IH 23674, 28007, 28097)	.....	18,000.00	4,872.26
Public Health Laboratory Service			
United States			
Alabama			
1927 (IH 23393)	2,237.95	.....	2,016.70
Louisiana			
1928 (IH 28031)	.....	500.00	.....
Missouri			
1927 (IH 23333, 23571)	1,800.00	.....	1,800.00
1928 (IH 23742, 28418)	.....	4,350.00	1,800.00
Oklahoma			
1928 (IH 28086)	.....	125.00	.....
South Carolina			
1928 (IH 23782)	.....	1,000.00	750.00

Tennessee			
1927 (IH 23442, 23529)	$258.75	$.....	$243.75
1928 (IH 23798-99)	.....	1,975.00	1,149.66
Texas			
1927 (IH 23334, 23570)	132.97	.....	125.37
1928 (IH 23896)	.....	1,200.00	800.00
Utah			
1927 (IH 23335, 23532)	3,750.00	.....	.....
1928 (IH 23807)	.....	3,600.00	.....
Virginia			
1928 (IH 28431)	.....	1,500.00	.....
Foreign Countries			
Colombia			
1927 (IH 23338)	921.00	.....	817.99
1928 (IH 23659)	.....	5,000.00	4,097.49
Costa Rica			
1927 (IH 23483)	25.00	.....	.....
Guatemala			
1927 (IH 23336)	2,206.71	.....	124.95
1928 (IH 28001, 28018)	.....	6,350.00	4,083.31
Nicaragua			
1927 (IH 23337)	1,327.39	.....	991.56
1928 (IH 23852)	.....	3,500.00	3,276.60
Public Health Nursing			
Brazil			
1927 (IH 23359)	8,781.63	.....	3,051.26
1928 (IH 23634)	.....	15,400.00	9,882.28
France			
1925 (IH 22675)	2,861.91	.....	.....
1926 (IH 22861)	10,500.00	.....	.....
1927 (IH 23482)	4,375.00	.....	.....
1928 (IH 23871)	.....	3,125.00	.....

EXHIBIT E—*Continued*

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
GENERAL BUDGET—*Continued*			
State Health Services—*Continued*			
Public Health Nursing—*Continued*			
Poland			
1928 (IH 28002)	$.....	$1,000.00	$.....
General			
Foreign Countries			
Bulgaria. National Office of the Direction of Public Health			
1928 (IH 28076)	.....	3,000.00	.....
France. Travel of departmental instructor of health work			
1928 (IH 23666)	.....	500.00	.....
Hungary. Institute of Social Hygiene			
1928 (IH 28022)	.....	2,817.00	.....
Hungary. School for Public Health Officers			
1928 (IH 23848)	.....	11,704.00	1,644.92
Jamaica. School Hygiene Unit and Dental Clinic			
1927 (IH 23034)	131.97	.....	73.88
1928 (IH 23620, 28095)	.....	783.00	395.40
Java. Division of Public Health Education			
1928 (IH 23684)	.....	25,420.00	6,920.94
Poland. Travel of supervisor of district health work			
1928 (IH 23670)	.....	1,000.00	.....
United States			
Iowa. Division of Communicable Diseases and Child Hygiene Work			
1927 (IH 23526)	400.00	.....	400.00
1928 (IH 23711)	.....	1,600.00	1,200.00
Illinois. Division of Public Health Education			
1927 (IH 23591)	400.00	.....	336.67

North Carolina. Life Extension Unit			
1928 (IH 23746)	.....	5,000.00	.....
South Carolina. Division of Oral Hygiene			
1928 (IH 23783)	.....	1,100.00	825.00
Bureaus for Study and Reform of Public Health Activities			
For study of public health problems			
Czechoslovakia			
1927 (IH 23356, 23569)	1,500.00	.....	1,074.47
France			
1926 (IH 23033)	21,000.00	.....	10,614.56
1927 (IH 23474)	15,000.00	.....	.....
1928 (IH 23870)	.....	15,000.00	.....
Hungary			
1927 (IH 23357)	1,211.68	.....	1,203.42
1928 (IH 23667)	.....	5,000.00	3,775.43
Poland			
1926 (IH 22855)	2,690.34	.....	.....
1927 (IH 23358)	7,990.87	.....	7,582.80
1928 (IH 23877)	.....	10,000.00	3,480.59
League of Nations			
Towards maintenance of an interchange of public health personnel			
1925 (IH 22472)	16,224.75	.....	15,401.08
1927 (IH 23362)	50,000.00	.....	49,817.98
1928 (IH 23676, 23850, 28037)	.....	51,515.42	.....
Towards development of epidemiological intelligence and public health statistics services and establishment of a center of public health documentation			
1927 (IH 23359, 23360, 23516)	60,745.87	.....	44,999.54
1928 (IH 23675, 23677)	.....	60,335.00	.....
Epidemiological Intelligence Bureau in the Far East			
1927 (IH 23361)	24,985.00	.....	.....
1928 (IH 23678)	.....	20,000.00	.....

EXHIBIT E—*Continued*

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
GENERAL BUDGET—*Continued*			
Public Health Education			
Schools of hygiene and public health			
Brazil			
Institute of Hygiene, São Paulo			
Equipment and supplies (IH 22672)	$146.53	$.....	$14.00
England			
London School of Hygiene and Tropical Medicine			
Operation (IH 23363, 23665)	13,681.87	25,000.00	19,479.52
Hungary			
School of Hygiene, Budapest			
Operation (IH 22640)	3,680.00	.....	3,680.00
Poland			
Institute of Hygiene, Warsaw. Support of biochemist (IH 23364)	1,200.00	.....	.....
Harvard Medical School			
Preparation and publication of revised edition of *Syllabus of Preventive Medicine* (IH 23373, 28115)	8,500.00	6,500.00	8,500.00
Study and training courses for health workers			
Health officers institutes			
Kansas (IH 23473, 28021)	47.23	125.00	86.28
Missouri (IH 23515)	43.73	.....	.....
Field training of workers selected by state and provincial health officers			
(IH 22767, 23099, 23446, 23879)	12,247.24	20,000.00	15,486.29

Travel of government health officials			
Travel of state health officials in United States and Canada (IH 22766, 23370, 23572, 23833, 28082)	$10,438.91	$20,000.00	$16,577.98
Travel of European health officials in Europe (IH 23139, 23371, 23834)	2,032.80	5,000.00	4,085.82
Travel of visiting health officials (IH 22281, 22654, 22765, 23372, 23835)	7,295.18	30,000.00	10,984.23
School for Sanitary Inspectors, Jamaica			
Training course (IH 23562)	33.17	.....	33.10
Training stations			
United States			
Alabama			
1927 (IH 23397–98, 23401, 23502)	2,030.26	.....	1,873.56
1928 (IH 23846)	.....	12,300.00	3,133.57
Ohio			
1927 (IH 23463, 23565)	2,722.95	.....	1,942.29
1928 (IH 23748–49)	.....	8,900.00	7,243.66
Summer courses for medical students. (IH 23032)	54.29	.....	54.29
Central Medical School for Native Medical Students, Suva, Fiji			
Maintenance (IH 23681)	.....	26,600.00	17,291.22
Fellowships			
Grants to doctors for study of public health			
Foreign and United States (IH 23365, 23605, 23829, 28087)	60,190.61	250,500.00	210,208.58
Resident			
China (IH 23503)	1,000.00	.....	.....
Hungary (IH 22865, 23367, 23830)	1,132.04	3,000.00	2,811.89
Italy (IH 22866, 23468)	743.52	.....	719.66
Poland (IH 22867, 23368, 23831)	4,938.59	4,000.00	5,436.53
Yugoslavia (IH 22868, 23369, 23832)	3,252.95	5,000.00	6,956.67

EXHIBIT E—*Continued*

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
GENERAL BUDGET—*Continued*			
Miscellaneous			
Field research in respiratory diseases			
1927 (IH 23589)	$1,714.75	$	$6.96
1928 (IH 28008)	.....	5,000.00	2,507.79
Tuberculosis survey in Jamaica (IH 23864)	.....	1,000.00	.....
Tuberculosis study clinic, Kingston, Jamaica (IH 28029)	.....	5,250.00	2,705.22
Equipment and supplies in connection with studies of verruga peruana (IH 28009, 28036)	.....	1,300.00	1,295.82
Field equipment and supplies (IH 23374, 23840)	2,172.69	16,000.00	16,621.28
Pamphlets and charts (IH 23374, 23840)	3,704.85	5,000.00	3,657.15
Express, freight, and exchange (IH 23374, 23840)	1,049.98	1,500.00	1,143.36
Hookworm and malaria films donated or lent (IH 23374, 23840)	570.10	1,000.00	334.93
Public health literature (IH 22871)	140.81	.....	.....
Field Service			
Salaries and expenses of staff			
Salaries (IH 23374, 23840)	44,696.24	463,000.00	438,373.77
Traveling expenses (IH 23374, 23840)	21,730.03	165,000.00	156,972.36
Commutation (IH 23374, 23840)	22,880.96	60,000.00	48,811.86

Medical examinations (IH 23374, 23840)	$882.00	$1,500.00	$450.00
Drugs for conserving health (IH 23374, 23840)	476.82	500.00	1.22
Bonding (IH 23374, 23840)	2,458.97	5,500.00	2,873.75
Automobiles (IH 23374, 23840)	1,238.90	3,000.00	Cr. 427.50
Insurance and retirement allowances (IH 23374, 23840)	19,280.26	45,000.00	46,154.76
Rio de Janeiro office. Administration (IH 23376, 23630)	9,596.87	17,200.00	15,421.46
	$1,647,980.74	$2,619,041.88	
Unexpended balances of appropriations allowed to lapse	482,594.13		
TOTALS: GENERAL BUDGET	$1,165,386.61	$2,619,041.88	$2,292,570.40
CAPITAL REQUIREMENTS			
Schools of Hygiene and Public Health			
Brazil			
Institute of Hygiene, São Paulo			
Building and equipment (IH 23141, 23380)	$154,113.00	$.....	$117,459.85
Canada			
University of Toronto			
Endowment (IH 23841)	.....	250,000.00	250,000.00
Czechoslovakia			
State Institute of Public Health, Prague			
Buildings and equipment (IH 21080, 22174, 22497)	343,386.17	.....	189,212.08
England			
London School of Hygiene and Tropical Medicine			
Land, building, and equipment (IH 23379-A)	216.52	.....	.....
Hungary			
State Hygienic Institute, Budapest			
Building and equipment (IH 22639, 23472)	49,702.46	.....	48,648.49

EXHIBIT E—*Continued*

	PRIOR APPROPRIATIONS	1928 APPROPRIATIONS	1928 PAYMENTS
CAPITAL REQUIREMENTS—*Continued*			
Schools of Hygiene and Public Health—*Continued*			
Trinidad			
Imperial College of Tropical Agriculture			
Towards maintenance of chair of sanitation and tropical hygiene (IH 23382-A, 23843)	$128.00	$5,000.00	$4,890.00
Turkey			
Central Institute of Hygiene of the Ministry of Health (IH 23842)	.....	80,000.00	80,000.00
Yugoslavia			
School of Public Health, Zagreb			
Building and equipment (IH 23381-A)	109.00	.....	.....
Schools of Nursing			
Brazil. D. Anna Nery School of Nursing, Rio de Janeiro	492.48	.....	198.34
Central Medical School for Native Medical Students, Suva, Fiji			
Towards enlargement of buildings (IH 23518)	5,200.00	.....	4,860.00
	$553,347.63	$335,000.00	
Unexpended balances of appropriations allowed to lapse	1,087.66		
TOTALS: CAPITAL REQUIREMENTS	$552,259.97	$335,000.00	$695,268.76
TOTALS: INTERNATIONAL HEALTH DIVISION	$1,717,646.58	$2,954,041.88	$2,987,839.16

EXHIBIT F
SUMMARY OF APPROPRIATIONS AND PAYMENTS

	PRIOR APPROPRIATIONS (BALANCES)	1928 APPROPRIATIONS	1928 PAYMENTS
GENERAL BUDGET:			
Central Administration	$111,126.46	$661,025.11	$656,641 62
Division of Medical Education	931,779.94	2,559,461.54	2,167,273.55
International Health Division	1,165,386.61	2,619,041.88	2,292,570.40
TOTALS: GENERAL BUDGET	$2,208,293.01	$5,839,528.53	$5,116,485.57
Capital Requirements:			
Central Administration	$7,190.75	$12,000,000.00	$12,000,000.00
Division of Medical Education	1,151,280.76	4,654,817.92	3,878,984.19
International Health Division	552,259.97	335,000.00	695,268.76
TOTALS: CAPITAL REQUIREMENTS	$1,710,731.48	$16,989,817.92	$16,574,252.95
GRAND TOTALS	$3,919,024 49	$22,829,346.45	$21,690,738.52
Prior Appropriations		$3,919,024 49	
1928 Appropriations		22,829,346.45	
TOTAL APPROPRIATIONS		$26,748,370.94	
1928 Payments:			
From principal	$12,000,000.00		
From income	9,690,738.52	21,690,738.52	
Balance payable on appropriations		$5,057,632.42	

EXHIBIT F—*Continued*

In addition to the foregoing, the Foundation has made pledges and appropriations which become effective in future years and which will require for payment the following amounts:

Year 1929	$10,796,933.00
Year 1930	3,007,796.00
Year 1931	1,192,213.00
Year 1932	577,525.00
Year 1933	330,550.00
Year 1934	106,960.00
TOTAL	$16,011,977.00

The Foundation has made authorizations effective in future years against which appropriations have not been made:

Year 1930	$551,500.00
Year 1931	45,000.00
Year 1932	45,000.00
Year 1933	45,000.00
TOTAL	$686,500 00

EXHIBIT G

STATEMENT OF PRINCIPAL FUND

GENERAL FUND

Balance in General Fund December 31, 1927		$162,291,624 50
Amount appropriated and paid to the China Medical Board, Inc		12,000,000.00
		$150,291,624.50
This fund is accounted for as follows:		
Securities	$127,602,161 41	
Secured demand loans	22,689,463 09	
	$150,291,624.50	

EXHIBIT H

LAND, BUILDINGS, AND EQUIPMENT FUND

		TOTAL Dec. 31, 1927	EXPENDITURES 1928	TOTAL Dec. 31, 1928
Home Office				
Library		$7,474.95	$1,331.44	$8,806.39
Equipment	$44,986.35			
Less depreciation	9,754.45	35,231.90	1,794.14	37,026.04
Paris Office				
Part interest in building occupied by Paris office		68,000.00	.....	68,000.00
Peking Office				
Building		10,809.25	.....	10,809.25
Shanghai Medical School. Land		298,331.95	.....	298,331.95
TOTALS		$419,848.05	$3,125.58	$422,973.63

By action of November 9, 1928, the Peking Union Medical College property was transferred to the China Medical Board, Inc.

Peking Union Medical College property as of December 31, 1927	$8,915,063.62
Expenditures during 1928	343,451.41
Property transferred to China Medical Board, Inc.	$9,258,515.03

EXHIBIT I

SCHEDULE OF SECURITIES IN GENERAL FUND ON DECEMBER 31, 1928

BONDS

NAME	INTEREST RATE PER CENT	DATE OF MATURITY	AMOUNT	FOUNDATION'S LEDGER VALUE PER CENT	FOUNDATION'S TOTAL LEDGER VALUE
American Telephone & Telegraph Co. Thirty-Year Collateral Trust	5	Dec. 1946	$100,000.00	97.75	$97,750.00
Brooklyn-Manhattan Transit Co. 6% Gold Notes	6	Aug. 15, 1929	250,000.00	98.972776	247,431.94
Chicago & Alton R. R. Refunding Mortgage	3	Oct. 1949	551,000.00	65.	358,150.00
Chicago & Alton Ry. First Lien (Certificates of Deposit)	3½	July 1950	854,000.00	53.	452,620.00
Chicago City & Connecting Railways Collateral Trust (Certificates of Deposit)	5	Jan. 1927	1,305,000.00	52.	678,600.00
Chicago, Milwaukee & St. Paul Ry. General Mortgage Series "C"	4½	May 1989	500,000.00	103.	515,000.00
Chicago, Milwaukee & St. Paul Ry. Receivers Equipment Trust Series "D"	5	$133,000 due Aug. 1 each year, 1929–40	1,596,000.00	98.25	1,568,070.00
Chicago, Milwaukee, St. Paul & Pacific R. R. Fifty-Year General Mortgage	5	Feb. 1975	190,000.00	95.	180,500.00
Chicago, Milwaukee, St. Paul & Pacific R.R. Convertible Adjustment	5	Jan. 2000	760,000.00	62.50	475,000.00
Chicago Railways Co. First Mortgage	5	Feb. 1927	500,000.00	97.	485,000.00

EXHIBIT I—*Continued*

NAME	INTEREST RATE PER CENT	DATE OF MATURITY	AMOUNT	FOUNDATION'S LEDGER VALUE PER CENT	FOUNDATION'S TOTAL LEDGER VALUE
Cleveland, Cincinnati, Chicago & St. Louis Ry. General	4	June 1993	$700,000.00	83.893	$587,250.00
Cleveland Short Line Ry. First Mortgage	4½	Apr. 1961	500,000.00	95.	475,000.00
Dominion of Canada, Government of, Fifteen-Year	5	Apr. 1931	500,000.00	94.565	472,825.00
Erie R. R. General Mortgage Convertible *Fifty*-Year Series "B"	4	Apr. 1953	1,065,000.00	74.7175	795,742.30
Illinois Central R. R. Refunding Mortgage	4	Nov. 1955	300,000.00	87.	261,000.00
Illinois Central R. R. Equipment Trust Certificates Series "M"	4½	$80,000 due May 1 each year, 1929–41	1,040,000.00	98.50	1,024,400.00
Interborough Rapid Transit Co. First and Refunding Mortgage (Stamped)	5	Jan. 1966	1,750,000.00	96.8571	1,695,000.00
Lake Erie & Western R. R. Second Mortgage	5	July 1941	100,000.00	100.	100,000.00
Lake Shore & Michigan Southern Ry. First Mortgage	3½	June 1997	926,000.00	87.	805,620.00
Lake Shore & Michigan Southern Ry. Debenture	4	May 1931	2,173,000.00	93.2649	2,026,647.20
Missouri, Kansas & Texas R. R. Prior Lien Series "A"	5	Jan. 1962	331,250.00	78.5	260,031.25
Missouri, Kansas & Texas R. R. Prior Lien Series "B"	4	Jan. 1962	331,250.00	64.5	213,656.25

Morris & Essex R. R. First and Refunding Mortgage	3½	Dec. 2000	$175,000.00	82.75	$144,812.50
Mutual Fuel Gas Co. First Mortgage	5	Nov. 1947	250,000.00	100.	250,000.00
National Railways of Mexico Prior Lien Fifty-Year Sinking Fund	4½	July 1957	50,000.00	13.	6,500.00
Secured 6% Notes for coupon due January 1, 1914		Jan. 1933	1,125.00	59.	663.75
Certificate Series "A" Interest in arrears			7,357.50	5.50	404.66
Certificate Series "B" Interest in arrears			13,500.00	.50	67.50
New York Central & Hudson River R. R. Thirty-Year Debenture	4	May 1934	330,000.00	88.45	291,885.00
New York, Chicago & St. Louis R. R. Debenture	4	May 1931	1,303,000.00	87.	1,133,610.00
New York Connecting R. R. First Mortgage	4½	Aug. 1953	500,000.00	95.69073	478,453.65
Northern Pacific Ry. Refunding and Improvement Mortgage Series "A"	4½	July 2047	390,000.00	91.57692	357,150.00
Pennsylvania R. R. General Mortgage	4½	June 1965	1,500,000.00	98.25	1,473,750.00
Pennsylvania R. R. General Equipment Trust Certificates Series "D"	4½	$30,000 due May 15 each year, 1929–41	390,000.00	98.50	384,150.00
Philadelphia & Reading Coal & Iron Co. Refunding Sinking Fund	5	Jan. 1973	167,000.00	94.25237	157,401.42
Pittsburgh, Cincinnati, Chicago & St. Louis Ry. Consolidated Mortgage Series "I"	4½	Aug. 1963	500,000.00	103.	515,000.00
Reading Co. General and Refunding Series "A"	4½	Jan. 1997	333,000.00	94.25	313,852.50

EXHIBIT I—*Continued*

NAME	INTEREST RATE PER CENT	DATE OF MATURITY	AMOUNT	FOUNDATION'S LEDGER VALUE PER CENT	FOUNDATION'S TOTAL LEDGER VALUE
St. Louis-San Francisco Ry. Prior Lien Series "A"	4	July 1950	$1,500,000.00	72.75	$1,091,250.00
St. Louis-San Francisco Ry. Equipment Trust Certificates Series "CC"	4	$50,000 due May 15 each year, 1929–43	750,000.00	93.95544	704,665.87
Seaboard Air Line Ry. Adjustment Mortgage	5	Oct. 1949	455,000.00	52.	236,600.00
Southern Pacific Co. Equipment Trust Certificates Series "I"	4½	$100,000 due June 1 each year, 1931–41	1,100,000.00	98.50	1,083,500.00
Southern Pacific R. R. First and Refunding Mortgage	4	Jan. 1955	100,000.00	86.	86,000.00
Standard Oil Co. (New Jersey) Twenty-Year Gold Debentures	5	Dec. 15, 1946	4,787,000.00	100.5	4,810,935.00
United States Fourth Liberty	4¼	Oct. 15, 1938	1,075,000.00	93.21347	1,002,044.80
Wabash R. R. Second Mortgage	5	Feb. 1939	120,000.00	97.8	117,360.00
Washington Ry. & Electric Co. Consolidated Mortgage	4	Dec. 1951	450,000.00	83.5	375,750.00
TOTAL BONDS					$28,791,100.59

STOCKS

NAME	NUMBER OF SHARES	FOUNDATION'S LEDGER VALUE PER SHARE	FOUNDATION'S TOTAL LEDGER VALUE
American Ship Building Co. Common	24,260	$54.173537	$1,314,250.00
Anglo-American Oil Co. Ltd. (Par £1) Voting	366,517	18.874803	6,917,936.32
Anglo-American Oil Co. Ltd. (Par £1) Non-voting	122,172	18.874803	2,305,972 49
Atchison, Topeka & Santa Fe Ry. Preferred	5,000	98.25	491,250.00
Atchison, Topeka & Santa Fe Ry. Common	21,944	95.43877	2,094,308 33
Atlanta, Birmingham & Coast R. R. Preferred	4,062	94.	381,828.00
Buckeye Pipe Line Co., The (Par $50)	49,693	87.4	4,343,168 20
Central National Bank, Capital	950	177.8538	168,961.10
Chehalis & Pacific Land Co. Capital	220	3 3084	727.84
Chicago City & Connecting Rys Participation Certificates Preferred	17,530	15	262,950.00
Chicago City & Connecting Rys. Participation Certificates Common	10,518	2	21,036.00
Chicago & Eastern Illinois Ry. Cumulative Preferred	3,000	34.	102,000.00
Cleveland Arcade Co. Capital	2,500	98.6222	246,555.56
Cleveland Trust Co. Capital	532	190.860	101,537 62
Colorado & Southern Ry. First Preferred	4,800	54.	259,200.00
Consolidated Gas Co. of New York Cumulative Preferred	13,333	91.75	1,223,302.76
Continental Oil Co. (Par $10)	100,000	6 951916	695,191.60
Cumberland Pipe Line Co. (Par $50)	6,000	7.6666	46,000 00
Eureka Pipe Line Co.	12,357	95.5	1,180,093.50
Galena-Signal Oil Co. Preferred (Certificate of Deposit)	4,193	100.	419,300.00
Galena-Signal Oil Co. Common (Certificate of Deposit)	20,000	8.2	164,000 00

EXHIBIT I—*Continued*

Indiana Pipe Line Co. (Par $50)	24,845	$85.1111	$2,114,585.28
Interstate Natural Gas Co., Warrants originally attached to First Mortgage Ten-Year Sinking Fund, expire January 1, 1930	2,000	50.	100,000.00
Kanawha & Hocking Coal & Coke Co. Preferred	202	20.	4,040.00
Kanawha & Hocking Coal & Coke Co. Common	668	4.	2,672.00
Manhattan Ry. Capital (Modified Guarantee)	10,000	68.25	682,500.00
Missouri, Kansas & Texas R. R. Co. 7% Preferred Series "A"	10,499	41.98228	440,772.00
National Transit Co. (Par $12.50)	126,481	21.5	2,719,341.50
New York Transit Co.	12,392	95.65826	1,185,397.26
Northern Pipe Line Co.	9,000	45.	405,000.00
Pere Marquette Ry. Preferred	5,740	54.56502	313,204.35
Provident Loan Certificates ($1000 par)	242	100.	242,000.00
Solar Refining Co., The	9,076	92.5035	839,561.76
Southern Pipe Line Co. (Par $10)	24,845	38.	944,110.00
South West Pennsylvania Pipe Lines	8,000	112.	896,000.00
Standard Oil Co. (Indiana) (Par $25)	460,760	43.35	19,973,946.00
Standard Oil Co. (New Jersey) Common (Par $25)	1,072,750	34.835714	37,370,012.50
The Standard Oil Co. (Ohio) Common (Par $25)	135,648	25.50	3,459,024.00
The Standard Oil Co. (Ohio) Preferred Non-voting Cumulative	17,088	106.	1,811,328.00
Tilden Iron Mining Co. Capital	890	27.35	24,341.73
Union Tank Car Co. Capital	60,000	26.768133	1,606,087.97
Western Pacific R. R. Corporation Preferred	28,609	30.705971	878,467.15
Wilson Realty Co. Capital	591	100.	59,100.00
Woman's Hotel Co. (In Liquidation) Capital 80% Paid	300		
TOTAL STOCKS			$98,811,060.82

SUMMARY

Bonds	$28,791,100.59
Stocks	98,811,060.82
TOTAL LEDGER VALUE OF INVESTMENTS	$127,602,161.41

INDEX

INDEX

PRINTED IN THE UNITED STATES OF AMERICA