

# TROPICAL MEDICINE AND THE CHALLENGE OF GLOBAL WAR<sup>1</sup>

JAMES STEVENS SIMMONS<sup>2</sup>

Fellow Members of the American Society of Tropical Medicine, Distinguished Guests, Ladies and Gentlemen:

## INTRODUCTION

I am glad to have this opportunity to thank you for selecting me as your President and to assure you that I appreciate the honor of serving at this Forty-Second Annual Meeting.

This should be an important meeting, for it comes at the most critical period in history—a period when decent people everywhere are rejoicing over the end of World War II and are planning hopefully, but fearfully, for a firm, lasting peace.

It is our second meeting since V-J Day, but the first to be held during the new Atomic Era. As you know, this Era is characterized by a general fear that civilization may be destroyed through the misuse of atomic power and by serious doubts as to whether man has the intelligence to control this new power peacefully and safeguard his own future. These fears are real and well founded; and thoughtful persons of all nations are searching earnestly for a practical solution of the problem. Statesmen are trying to solve it by international agreements, but their efforts are hampered by ancient ingrained hatreds, jealousies and distrust. So far, it appears that the most promising approach to mutual understanding and peace lies in the field of international health. The importance of physical and mental health is universally recognized, and no one doubts the integrity of the unselfish men and women of every nation who are devoting their lives to the humane profession of public health. Therefore, as members of this important profession, we of the Society of Tropical Medicine now have an opportunity to contribute to the security of man's position as an intelligent, peaceful, civilized animal.

During the four decades of its existence, our Society has assisted materially in extending the frontiers of scientific knowledge in the field of tropical medicine and has contributed much to the health and welfare of the human race. Obviously, we must be prepared to meet the problems of the future. Therefore, I feel that this meeting has a special significance for all of us, for it affords a unique opportunity to re-examine our objectives and to re-dedicate ourselves to the difficult task that lies ahead.

In keeping with this spirit, I have selected for today's Presidential address the subject, "Tropical Medicine and the Challenge of Global War", which will be followed at the meeting of the Academy this evening by an address entitled, "Tropical Medicine and the Challenge of Global Peace."

In the present talk, I wish to emphasize the fact that throughout the ages the

<sup>1</sup> Presidential address, delivered at the luncheon of the American Society of Tropical Medicine, Miami, Florida, November 6, 1946.

<sup>2</sup> Brig. General, U. S. Army; Dean, Harvard School of Public Health.

tropics have constituted a vast reservoir of disease, which has always been a menace to world health, and to show that by meeting the challenge of these diseases in the past tropical medicine has already made a significant contribution to our health and security, especially under the trying conditions presented by the recent World War.

The full importance of the wartime contribution of tropical medicine can be visualized by keeping in mind the wide field covered by this branch of medicine and the magnitude of the military health problems presented by the tropical diseases. The term "tropical medicine" is used here in its broadest sense. It refers to all aspects of medicine and public health as they apply to conditions in the tropics. Obviously, it includes the diagnosis, treatment, and prevention not only of the diseases indigenous to such regions but to a host of others which may exist anywhere but which flourish best and are most prevalent in the hot parts of the world.

We are all familiar with the fact that certain infections, such as African Trypanosomiasis, are limited to specific tropical areas because the conditions necessary for their spread—in this case, the tsetse fly—do not exist elsewhere. Other insect-borne diseases, including yellow fever, malaria, and dengue, are most common in their tropical reservoirs, where climatic conditions favor their propagation throughout the year; but they can and have spread to certain temperate regions, where their vectors exist during warm seasons. Thus, malaria, which is most prevalent among the people of the tropics, is also widespread in many temperate countries. In fact, it still causes more disability and death than any other known infection. Malaria was once common in all parts of the eastern United States, and even today it presents an important health problem in certain southern states. Yellow fever is another dangerous tropical disease which is a continuing menace to world health. At present, it is confined largely to its two vast jungle domains in South America and Africa, and it has not appeared in this country since 1905. During the past, however, this disease was a frequent summer invader of temperate zone ports, and it caused serious epidemics as far north as Philadelphia, New York, and Boston. Dengue fever has long been endemic in many temperate regions, including the southern United States.

The tropical zone is not only a productive incubator of these and various other insect-borne diseases, but it is a spawning place for the innumerable filth diseases which are spread by contact or by the ingestion of contaminated food or drink. Tropical skin infections undoubtedly result in part from climatic conditions. However, in this case, as with most of the filth diseases, a more important factor is the low standard of sanitation and hygiene that prevails generally among the impoverished, backward peoples of many tropical regions. Yaws is a widespread tropical disease. Leprosy was formerly prevalent in Europe, but is now most common in the tropics. The enteric infections are also well-known examples. The dysenteries and typhoids may occur in any part of the world. Their incidence has been markedly reduced in many temperate-zone countries, but they are still the curse of most tropical places. Cholera is still a potential wholesale killer in tropical Asia. At present, it happens to be confined largely

to that area; but during the past, this disease has repeatedly crawled out of its filthy lair in the Ganges delta to slither along the trade routes of the world, spreading death and terror among the peoples of all nations, including the United States. Thus, while it may be difficult or impossible to classify diseases strictly into tropical and temperate categories, it is obvious that the tropical regions of the earth do constitute a great reservoir which serves as a breeding place for many of the dangerous diseases of man. These diseases are not only a constant menace to the local inhabitants and to visitors from the temperate zones, but they are a potential hazard to the whole world.

This situation has probably existed during the entire period of man's stay on earth. Nothing is known about the diseases of pre-historic man, but the geologists report that certain insects now recognized as disease vectors were present long before the appearance of the genus *Homo*. They tell us that since man's creation the earth has been passing through one of its periodical ice ages but that during this period warm climatic conditions have always existed in the equatorial regions. The dangers of life in the tropics have been recognized at least since the beginning of historic time. The ancient Greeks divided the earth into five zones and thought that only the two temperate zones were suitable for human existence, the others being either too cold or too hot. This concept persisted and discouraged European exploration of the tropics until late in the Fourteenth Century. During the period of great exploration which followed, vast tropical areas were discovered, conquered, and exploited by Europeans; but, as a rule, these hot regions were not colonized as successfully as were the more temperate parts of the New World. Even today, some of the most sparsely settled areas of the globe lie in the cold polar regions and in the disease-ridden tropics. These regions are not uninhabitable. If freed of their diseases, many potentially rich tropical areas would afford a desirable place in the sun for many of the earth's inhabitants. Thus, the solution of this problem is a continuing challenge to our profession of tropical medicine.

The significance of this statement is obvious when one considers the contribution of tropical medicine to the improvement of world health during the brief period of its development as a special field of medicine. The great medical revolution which started in Europe during the last century led to a rapid accumulation of basic knowledge about the micro-biological sciences—protozoology, bacteriology, virology, and medical entomology. These sciences afforded a sound basis for the phenomenal development of medicine and public health which followed in certain countries of the temperate zone.

The United States affords a good example of this progress. Health conditions here are still far from ideal, but during the present century there has been a great reduction in our disease and mortality rates; and the span of life has been enormously increased. Many enteric diseases are better controlled; and since the New Orleans yellow fever epidemic of 1905, this country has not experienced a serious invasion by any tropical or exotic disease. Therefore, if we except a few infections, including malaria, dengue, and the dysenteries, which still occur in certain localities, the Twentieth-Century experience of Americans with tropi-

cal diseases, prior to World War II, occurred largely outside the United States and among those who travelled to tropical regions for social, industrial, or military reasons. As a consequence, Americans as a group gradually lost interest in tropical medicine and by 1940, many of our physicians, especially those living in northern states, were convinced that this specialty had lost much of its former importance to American medicine. It was commonly held that in this country tropical medicine had worked itself out of a job and had become a matter of concern only to the less fortunate inhabitants of southern climates. The fallacy of such shortsighted thinking was made apparent by our national experience during World War II.

#### TROPICAL MEDICINE DURING WORLD WAR II

Tropical medicine played a vital role in the winning of that war. There has never been a time when so many soldiers and sailors from temperate countries were engaged in active military operations under conditions of such widespread exposure to tropical diseases. When the story is finally told of the total contribution of tropical medicine to Allied victory, it will constitute one of the great epics of scientific medicine.

The medical profession of the United States played an active part in this Allied health program, and every medical agency of this country, both civilian and military, contributed to its success. The Army and Navy were intimately concerned since they were faced with the emergency problem of protecting American soldiers and sailors against the disease hazards of practically every region of the world. You are all familiar with the wonderful work of the Navy during the war. I should like to discuss this contribution now, but as I was more intimately concerned with the Army program we will use it as an example of the operations of the armed services. The experience of the U. S. Army alone is sufficient to indicate the broad scope of the contribution made by tropical medicine during the war, for similar programs were carried out by the U. S. Navy and by the armed forces of certain of the other Allied nations.

The active planning for the tropical-disease-control program of the Army began early in 1940. It has as its objectives: first, the development of an effective organization to protect American troops against the diseases of the tropics at home and abroad; and second, the development of adequate safeguards to prevent the introduction of exotic diseases into the United States.

As the scene of our military activities reached out, first, into the Caribbean and, subsequently, into Africa, India, and the islands of the Pacific, the diseases of these regions constituted an increasingly important military problem. The experience gained in meeting this problem should be of great value to the medical profession, for it affords a pattern for future planning. The first need was for a special organization in the Office of the Surgeon General to plan the tropical disease-control program. For this, specialists were obtained in various fields, including internists, parasitologists, bacteriologists, entomologists, sanitary engineers, and others. Civilian specialists were mobilized as consultants and

advisors to assist in developing and operating the program. The American Society of Tropical Medicine furnished many of these workers.

Briefly, the program had the following broad objectives: (1) The collection of information about the disease hazards of all regions in which American troops might be exposed and the use of this information for planning and for the instruction of troops sent abroad, (2) the training of military personnel in the prevention and treatment of tropical diseases, (3) the development of a research program to provide the new basic information and materials required for the military practice of tropical medicine, and (4) the energetic application of all the available information in order to meet the tropical disease problems of the war.

The collection of information about the distribution of disease was organized as a part of the Medical Intelligence Division of the Preventive Medicine Service.

The training of military personnel presented a more serious problem. As a large proportion of the army physicians were recruited from civil life, they were confronted with tropical-disease situations with which they had had little or no experience. As already mentioned, the profession as a whole had lost interest in tropical medicine, and in many of our medical schools the teaching of this subject was either inadequate or altogether lacking. At first, the Surgeon General attempted to meet this deficiency by developing special short courses in tropical medicine for medical officers after they entered the Service. However, only a small fraction of the military physicians in need of such instruction could be reached in this way. Therefore, a longer ranged program was planned. Arrangements were made through the National Research Council to secure a grant to improve the teaching of tropical medicine in the civilian medical schools engaged in training officers for the Army and Navy. Through this grant, 63 of our 77 medical schools sent members of their faculties for short courses in tropical medicine at the Army Medical School, at Tulane, or elsewhere, and many of these men were later given field experience in various parts of tropical Central America. This was done with the hope that upon their return to their respective medical schools they would assist in the teaching of tropical medicine to students preparing for military service. This training program was of real value, and it did much to create a new interest in tropical medicine in America.

The medical research program was one of the most extensive ever launched by a military force, and it produced valuable information which will be of lasting benefit to humanity. The Army program was carried out by both military and civilian scientists. It was closely co-ordinated with the programs of the Navy and the U. S. Public Health Service, and all these were supplemented and spear-headed by the joint medical research program sponsored by the National Research Council and the Committee on Medical Research of the Office of Scientific Research and Development. This national research effort provided many new and effective methods and agents for the treatment and control of tropical diseases. Protective clothing, repellents, and insecticides were made available for the field attack on insect-borne diseases. New drugs, including the sulfonamides

and penicillin were developed for the treatment of many types of infections. Improved vaccines were used against yellow fever, epidemic typhus, tetanus, Japanese B Encephalitis, and influenza; and new therapeutic drugs were found and used for the suppression and treatment of malaria. The application of these and the many other results of this research program contributed directly to the conservation of American manpower and to allied victory.

The value of the Army's wartime tropical medicine program is shown by the official records of the incidence of tropical infections.

American troops were in contact with exotic diseases in all parts of the world, but the record established in preventive medicine was spectacular. Millions of soldiers were exposed to louse-borne typhus in Africa, Asia, and Europe, but they

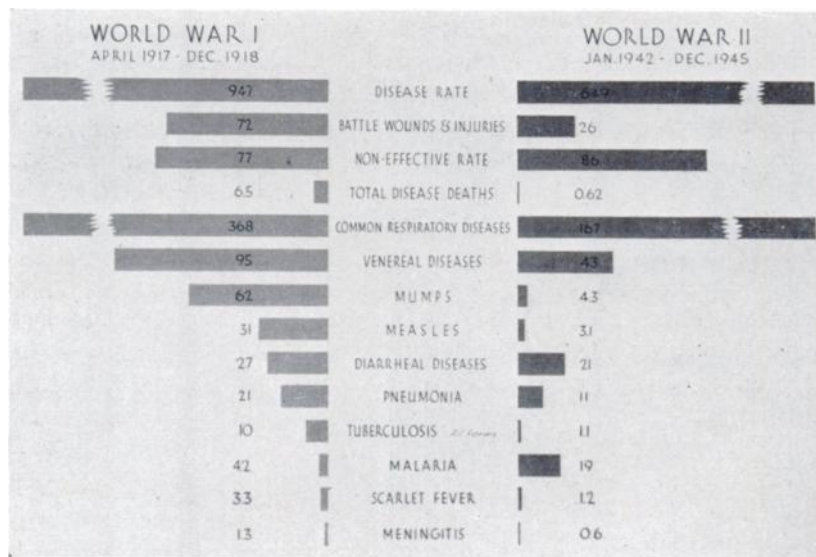


CHART 1. THE DISEASE INCIDENCE RATES OF THE ARMY IN WORLD WAR I AND WORLD WAR II (Rates per 1000 troops per year)

(Courtesy U. S. Army Medical Museum)

were protected by typhus vaccine and DDT louse powder. Thanks to military sanitation and cholera vaccine, thousands of soldiers served without infection in the cholera-infected cities of India. Vaccines, rodent control, and DDT were used successfully to protect troops exposed to civilian epidemics of bubonic plague in Africa and elsewhere. Military personnel passing through endemic yellow fever areas in South America and Africa were immunized with yellow fever vaccine.

The Army was protected against these and other diseases, including smallpox and the typhoid fevers. Still others, including yaws, leprosy, and African sleeping sickness, failed to appear.

The relative incidence of the tropical diseases that did occur is indicated in Chart 2.

There was not a single case of either yellow fever or plague among our millions of troops. There were only two cases of trypanosomiasis, 13 of cholera, and a few hundred each of relapsing fever and leishmaniasis.

The Schistosomiasis infections, numbering less than 2000, were contracted in the Philippines, largely among personnel of the Engineer and Signal Corps, whose duties required their exposure in infested waters.

Filariasis was responsible for only about 2000 hospital admissions. These infections were contracted early in the war on a few small islands of the South

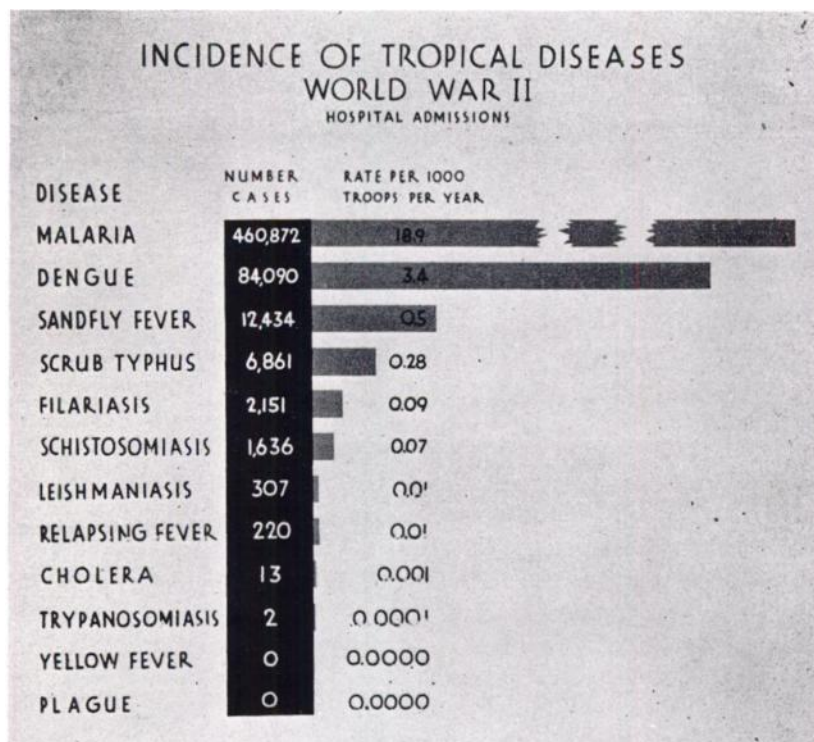


CHART 2. TROPICAL DISEASES IN THE U. S. ARMY

(Courtesy U. S. Army Medical Museum)

Pacific before adequate mosquito control measures were enforced. The cases were mild and there were no serious permanent complications.

Scrub typhus caused less than 7000 admissions, but it was of considerable military importance in parts of the Western Pacific and in Burma. In different outbreaks, the mortality varied from 1 to 30 per cent. Effective methods were developed by the United States of America Typhus Commission for the protection of troops against this disease, by the burning of campsites to destroy the mite vectors and the use of dimethyl phthalate and other miticidal agents for individual protection.

Sandfly fever was responsible for about 12,000 admissions, and dengue fever for about 84,000. Both are mild, non-fatal, self-limited diseases. Their mili-

tary importance is due to the fact that in susceptible populations they tend to occur in explosive, epidemic form. The Army Epidemiological Board developed a vaccine for dengue, and DDT was used to control the phlebotomus vectors of sandfly fever and the mosquito vectors of dengue.

Malaria was the most important tropical disease faced by American troops. There were 460,800 hospital admissions, a rate per annum of 18.9 per 1000 troops. These admissions included relapses and do not indicate the actual number of persons infected. About  $\frac{2}{3}$  of the admissions were to hospitals overseas; and the hospital admissions in this country consisted largely of patients with relapses from overseas infections. Deaths were rare.

The malaria control program in the continental United States was highly effective. The Army's program of mosquito control inside military reservations, which cost about 17 million dollars, was supplemented by the program of the United States Public Health Service in war areas at a cost of more than 19 million. As a consequence, the Army's annual admission rates for malaria contracted in this country were negligible, and they decreased progressively each year of the war. Only about 4000 cases were contracted in the United States during the entire war.

The overseas experience was worst early in the war when, because of the military situation, troops fought in highly malarious regions without adequate malaria-control supplies or protection against mosquitoes. Later, when control organizations were firmly established, when supplies became adequate and soldiers were better disciplined in personal protective measures, the malaria rates decreased. In 1945, for example, the total overseas rate for malaria was 25 per 1000 men compared with the peak of 160 in 1943. The new agents developed for malaria control, including such drugs as "Chloroquine" and new insecticides, particularly DDT, not only render military field control more effective, but they afford important weapons for civilian use.

Other tropical diseases encountered by troops include the diarrheas and dysenteries, which caused considerable loss of time but relatively few deaths; and the skin diseases, which were annoying but usually not dangerous.

The Army program was not only concerned with the protection of troops but with the protection of the United States against invasion by exotic diseases. Careful plans were made to afford such protection and barriers against disease were set up all along the line from the tropical theaters to the separation centers here at home. At each barrier, the soldier was examined; and, if necessary, he was treated to avoid spreading disease to civilian communities. An important part of this program was the work of the Inter-Departmental Quarantine Commission established in co-operation with the Navy and the United States Public Health Service. On the whole, these barriers against invasion were effective, and the few diseases that have slipped through have been promptly identified and controlled. Consequently, there have been no serious epidemics traceable to American soldiers or sailors returned from overseas.

This wartime experience with tropical diseases was a jolt to the complacency of those who formerly assumed that tropical medicine was no longer of importance



to the United States. It showed that the diseases of the tropics are still a hazard to Americans who travel or live in certain foreign countries. It showed that this country is still exposed to invasion by exotic diseases and indicated the importance of modifying quarantine procedures to meet the new methods of transportation. Finally, it emphasized the urgent need for a continuing national program of research and training in order to control tropical diseases, both here in the United States and in their tropical reservoirs.

In closing, it should be emphasized that we are still concerned with tropical medicine. The American Medical profession has met the challenge of the diseases of the tropics under the trying conditions of war. It can and must continue to meet this challenge during the future years of peace.