

## ON MEDICINE AND WARFARE IN THE TROPICS

By DR. C. M. HASSELMANN

*Never before in the history of warfare have battles been fought and troop movements taken place in such vast areas of the tropics and subtropics. In North Africa and in the Near East, in the Black Sea area, on Madagascar and in Iran, India, and Burma, in South China, Malaya and the Dutch East Indies, in the Philippines, the islands of the South Seas, on the north coast of Australia, and in the Caribbean Sea, millions of soldiers are facing each other, marching, fighting, maneuvering for position, parched with thirst in the deserts, in clothes permanently soaked in the humid jungles, cramped in makeshift camps, surrounded by clouds of mosquitoes, and exposed to disease. War is a grim business anywhere, but warfare in the tropics, because of the abundance of tropical diseases, adds horrors of its own and requires additional measures and morale on the part of the fighting forces. The victories of the Japanese in southeast Asia and of the German/Italian forces in North Africa can only be fully appreciated if it is realized that, apart from fighting the enemy, they have to fight dreadful diseases.*

Since large-scale warfare in the tropics is unprecedented, we have asked Dr. Hasselmann to write on its medical aspect. Our author was an officer in the first World War, received his doctor's degree at the University of Würzburg and his degree in tropical medicine from the famous Tropical Institute of Hamburg. For the past fifteen years he has been a practicing physician and surgeon in the tropics. He did post-graduate work at the Mayo Clinic in Rochester and research work in various tropical countries, including the Philippines, China, British India, Iraq, Syria, and Palestine. He is a member of various German and other medical societies and has contributed articles on clinical subjects to medical journals in various countries. Owing to the present war he has left Manila and is now living in Shanghai.—K.M.

**S**INCE hostilities in the Pacific commenced, by far the largest war area has been made up of the tropics or of adjacent territories where allied climates and maladies exist.

The tropics proper comprise the belt between the Tropic of Cancer and the Tropic of Capricorn, but this geographical limitation falls far short of embracing other vast regions with similar climate and diseases. In our map we have included approximately the regions with pathology representative of the tropics.

The primary duty of an army medical service is to determine the physical and mental fitness of draftees and volunteers; to make all preparations humanly possible

to keep the personnel healthy and fully able to perform required duties with minimum time on the sick list; to restore the wounded as quickly and completely as possible; and to determine impartially the degree of incapacity of invalidated casualties for purposes of compensation and rehabilitation in civilian life.

We are not aware of any disease which affects certain races only, although the study of comparative pathology reveals that variations in the course of diseases are discernible in different races. It likewise becomes evident that some races possess a distinct susceptibility to certain diseases. But the major problems of present warfare in the tropics are, on

the one hand, the vastness of the combat theater with the difficulty both of adequate supply and proper care of the sick and wounded, and, on the other, coping efficiently with the four paramount tropical diseases — malaria, enteric fevers, impetigo and ringworm, and nutritional deficiencies, apart from ordinary diseases and problems of hygiene.

#### PAST EXPERIENCES

The exigencies of war with its massing of large bodies of men have boosted preventive medicine from the bleachers to the reserved box in the grandstand. Many of the Crusades failed because of pestilence, mainly malaria, bubonic plague, and enteric fevers. In 1348, the year of the "Black Death," probably one quarter of the entire population of Europe died of bubonic plague. In the Crimean War the British lost 4,600 killed in battle and 17,500 from disease, the French 20,240 killed and 75,000 from disease. As late as in the Boer War, more men died of typhoid fever

than in battle. For the first time in the history of protracted warfare, medical science triumphed in the years 1914 to 1918, when disease claimed fewer victims than did weapons.

An outstanding achievement of World War I was the heroic stand of the German Colonial Corps in East Africa under General von Lettow-Vorbeck. Cut off from all supply routes, the replenishment of ammunition and vital medical supplies was attempted by raids on enemy bases and stores. In some regions even cinchona trees were planted with a view to eventual quinine production. The chief problem in the field of operations was to

find water, and enough of it, besides food and proper clothing. As for diseases, malaria and the dysenteries took the heaviest toll. They were the same obstacles which faced the builders of the Panama Canal, who mastered them only at enormous cost in money and men and with every conceivable help at their command.

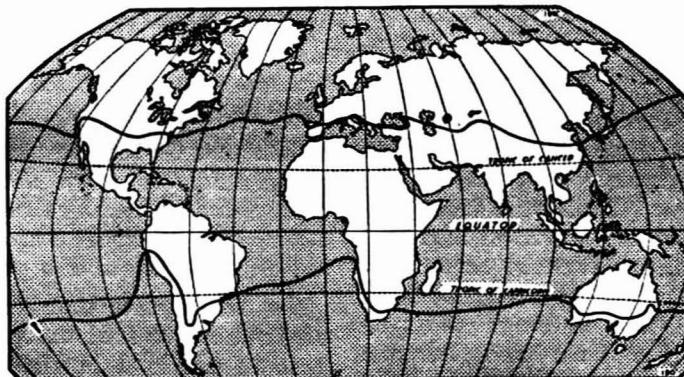
#### MALARIA

More than any other single health problem in tropical warfare, malaria demands the lion's share both in control effort and in treatment. To conquer this premier malady of the hot countries is not yet possible, but effective control is indispensable in order to maintain the combat power of the troops. Malaria has often had a hand in changing history.

The decline of both Greek and Roman culture was precipitated by malaria. The native population could offer little resistance, whereas the slaves from Africa and the East were highly immune. Yet

Fate spared neither side: it was also malaria that felled Alaric on his victorious march to the south; he had just conquered the Eternal City and was carrying the might of the Visigoths to North Africa. And more than once did malaria turn the tide against the proud Ghibelline emperors who had been victorious in the battlefield.

Malaria's peculiar mode of infection requires the anopheles mosquito. Only a few races of this species are vectors (disease carriers) of any consequence, and only against these must effective control be directed. However, whereas one anopheles type is a most dangerous vector in one country, it may be quite harmless



Regions with pathology representative of the tropics. They are approximately bordered in the north by the yearly mean isotherm of 59° F., in the south by that of 68° F. shown on our map

in another. In Yugoslavia, malaria is chiefly transmitted by *Anopheles maculipennis*, a species that becomes progressively rarer to the south, where the prevailing temperature is already above its optimum of life. In the Philippines the principal carrier is *Anopheles minimus*, which breeds in the foothills' slow-running streams and sluggish brooks banked by weeds and leaf-debris. But the lowlands are conspicuously free, in spite of rice fields and their irrigation canals. Hence control measures are comparatively simple, nor do they conflict with established agricultural habits. In neighboring Java and in the Malay Peninsula, however, the most dangerous species is *Anopheles ludlowi*, which breeds not only in rice fields but even in the brackish water of fish ponds. Here effective control is bound to interfere with the customs and ways of life to such a degree as to be incompatible with the established manner of livelihood of the population.

Branding the enormous harm done by the myriads of insect pests, the great entomologist Howard has passed the mournful judgment that we flatter ourselves to be living in the era of Man but are actually still enslaved in the era of insects. This applies to malaria more than anything else. Although the passages through the Suez and Panama Canals are now kept safe, control of the fecund mosquito is a continuous gargantuan task. In the forests of Madagascar, in the oases of North Africa, in the jungles of Malaysia, in the disembarkation camps at Basra, in the oil fields of the Caucasus and along the vital railroads of Soviet Central Asia, malaria is the chief health impediment. It can be checked, where the cost is worth the money—in saved lives or in terms of crops and commerce. But continuous control measures permit no slip.

Control measures vary according to the soil and the peculiar breeding conditions of the responsible anopheles vector. In tropical warfare, advance study is required of the malaria peculiar to the area under consideration and of the habitat of the pertinent transmitter. Under field

conditions, and especially in a war of rapid movement, effective measures against the mosquito are extremely difficult. It is rarely possible to accommodate advancing troops in adequately screened quarters or to provide and enforce the use of individual mosquito nets. Only in some instances will commanders be able to select camping places where anopheles are likely to be absent.

So medicinal prophylaxis is often the only remaining means of prevention. But this must be rigidly enforced, since the careless attitude of officers and men has often been responsible for great losses. The individual soldier, shunning the unpleasant accompanying side-effects of the medicament, too often lacks sufficient insight. During the Great War, for instance, medical officers could only make sure of the men really taking their quinine dose by lining up officers and men, giving them quinine dissolved in water, and letting each say his name after he had swallowed the bitter fluid.

The new German synthetic antimalarial drugs mean progress of the first magnitude and, notwithstanding their high cost and their side-effects, open up a new avenue to the quickest cure of that perfidious malady.

In the Great War the incidence of malaria on the Balkan front near Salonika rose to nearly a hundred per cent. No less may be expected today in some malaria-ridden districts unless preventive measures have been effectively carried out. As in many other fields, war again provides a mass experiment on a scale hitherto unparalleled. But results in various areas can only be compared if similar conditions prevail and if prophylactic medication has been rigorously enforced.

#### THE ENTERIC FEVER GROUP

Seen as preventable diseases, the enteric (intestinal) fevers must be dealt with from the standpoint of epidemiology, which considers the mass aspect of the disease, not the sick individual. It reckons with the group, or herd, as the unit of observation.

Though their apposite microbes are widely at variance, cholera, typhoid fever,

the paratyphoid fevers, and both dysenteries can all be classed under one heading from the point of view of preventive epidemics. They have much in common. No animal host is required. Infection invariably means a short circuit between the excretions of one person and the mouth of another, however indirect that route may be. As a matter of fact, direct contact transmittal is rare, but infection is brought about in great part by mouth through food and drink. A surreptitious draught of polluted water or from a contaminated cup may have dire consequences, especially in the case of cholera. Osler's triad of three "F's" ranks first among routes of transmittance:

Feces — Fingers	— Food
Feces — Fomites (Rubbish)	— Food
Feces — Flies	— Food

To avoid defects in sanitary organization is particularly difficult when large troop movements are necessary. Proper disposal of human excreta, of garbage and rubbish is perplexing enough in civilian life wherever large numbers of people are gathered. Human disease carriers play a very important part in the causation and recurrence of epidemics, whether they are convalescents or chronic carriers. The outbreak of explosive epidemics is greatly enhanced by a combination of factors such as the arrival of new susceptible individuals (troops from other regions, for example) in an area of low sociological and hygienic culture favoring the eventual intake of the pertinent micro-organism.

In the Boer War enteric fevers were still far more fatal than shells and bullets. In the years 1914 to 1918 they were almost negligible. In no other realm of health has preventive medicine triumphed to such a degree, partly through the diligent enforcement of general hygienic measures and partly owing to the proper prophylactic inoculations.

#### IMPETIGO AND RINGWORM

Sweat and humidity promote the softening up of the skin on which pyogenic (pus-producing) bacteria and fungi then

thrive. Healthy skin is greatly impervious to both. But the manifestations of either frequently follow upon a breakdown, at least locally, of natural resistance as well as upon massive contaminating contact with germs. The latter abound in military camps and in the open, and the former often occurs when general personal hygiene becomes difficult or impossible to pursue, with bathing and soap at a premium. Now conditions are ideal for microbes to hunt Man, and an army may suffer seriously from this persecution.

The superficial pus-filled blisters and blebs of impetigo are caused by pyogenic bacteria. They are the marks of a dirt disease which affects principally children. But, given favorable circumstances, the impetigo pustules may spread like wildfire on the adult's skin, too.

In susceptible skin certain fungi may produce various skin eruptions. They have nothing to do with "worms," but the colloquial term "ringworm" alludes to the occasional serpiginous configuration (ring-shaped, progressive patches on the skin) caused by them. Fungi are a low species of plant. Some of them are yeasts and molds; others are apt to invade the superficial layers of the human skin or even attack inner vital organs.

Moist, softened skin is especially suited for such an invasion. Hence the skin folds, the groin, and the spaces between the toes and fingers of most people become affected by one or another fungus infection, though gross subjective symptoms may remain absent for a long time. "Athlete's Foot" refers to the infection acquired on out-of-door tracks and in shower-rooms when no shoes are worn. In the tropics, ringworm is often transferred through contaminated laundry: "Dhobie Itch," *Dhobie* being the very low Hindu caste entrusted with the washing of clothes.

The prickly heat of the tropics in its simple form is not a ringworm affection but a form of eczema many people suffer as a result of profuse sweating on hot and humid days, often after taking alcohol

and hot and spicy food. But as a result of chafing and scratching due to the itchiness of prickly heat, ringworm infection may well supersede.

Under active-service conditions in warm climates, particularly in a war of movement, it is usually impossible to procure adequate bathing, much less laundering. Marching through lowland jungles, legs and feet never get dry, and the spaces between the toes become an ideal place for fungus growth. An army marches on—but not when it is footsore.

#### NUTRITIONAL DEFICIENCIES

Although distinct nutritional diseases like beriberi, scurvy, and keratomalacia will hardly occur frequently among the selected healthy manpower of a modern army, the quartermaster corps faces a major task in the tropics in providing a diet with what are known as "protective foods." Except in a frozen state and in large cities, meat is seldom available locally in sufficient quantity and faultless quality. Dairies are small, few, and far between. Minimum requirements for the necessary vitamins in food become hard to meet. Among them, Vitamin C is probably the most vital yet the least stable. Vegetable and fruit are its main source. Even in peace time, such an agricultural country as the Philippines had every month to import over three thousand tons of vegetables and about twelve hundred tons of fruit and nuts! With the Herculean problem of transport in war time, it is well-nigh impossible to secure these needs for large bodies of troops. Yet any organized feeding of armies designed adequately to maintain health must necessarily be based upon sound nutritional considerations rather than on the daily swallowing of tablets of alphabetical portraiture.

#### OTHER IMPORTANT DISEASES

Occasionally one or the other of the ubiquitous diseases may assume a position of the first magnitude in the tropics. Among them is dengue fever, which can incapacitate great numbers of men, as anyone who has ever suffered the splitting

headache and excruciatingly painful spine it causes will tell you. With the pertinent mosquito carrier omnipresent, humans and even monkeys seem to form the reservoir for the causative virus of explosive flare-ups in epidemic form. As a rule, no one dies of dengue, though during an epidemic in Greece a few years ago many people are said to have succumbed. Pappataci fever is a similar malady, also caused by a virus, and transmitted by sandflies.

The spirochete of Weil's Disease (infectious jaundice) is usually plentiful where urine of rats soils toilet floors, and in certain creeks and swimming pools. Especially in Egypt and the Far East, flukes of the *schistosomum* species are widespread; their intermediary hosts are specific snails. From these snails, cercariae (larvae) emerge during the hot hours of the day. They penetrate the skin of men swimming in the infested pool or wading through irrigation ditches.

Hookworm is the plague of all military camps in the tropics where the ground becomes infested through the indiscriminate disposal of human excreta. The larvae soon hatch in moist soil and infect the human host through the skin, usually when he is barefooted. By the installation of proper latrines, German medical pioneers succeeded in doing away with this scourge in the plantations throughout the Dutch East Indies. In a world-wide campaign supported by large funds, the Rockefeller Foundation followed suit and liberated millions of people from this pestilence. Infestation with the common roundworm is much more widespread than with hookworm, but usually less serious. Like dysentery, infection generally takes place by eating raw vegetables or fruit (such as strawberries) from gardens where human excrements have been used for fertilizing.

In some of the dry, hot, dust-ridden countries such as Egypt and parts of China, trachoma of the eye is a serious problem, with no known preventive except the control of flies. Herded together under poor sanitary conditions, large troop contingents are also widely

exposed to relapsing fever; it is transmitted in Africa by certain ticks and here in China by body lice. Though it is mostly acquired in childhood, infection may loom in heavily infested areas when nutrition is inadequate and other diseases have lowered general resistance.

In dry sandy ground and on the clay floor of huts, chiggers may abound. Boring into toes and soles by the score, this flea species can disable whole detachments. And men marching through some of the wet jungle forests of southern Asia and the Pacific Islands run the gauntlet of bloodthirsty leeches teeming in the foliage and sodden grass.

Finally there is the host of insects to be found in hot, humid countries with a low hygienic level and a poor standard of living. Foremost among them ranks the nuisance from the common mosquito, even when not transmitting disease; but the annoyance from bedbugs, fleas, and ticks may also be considerable and affect the strained nerves of fighting men.

Sunstroke, with excessively high fever and dangerous unconsciousness, as well as its less serious preliminary stages, can be prevented by rigorously forcing the troops to wear proper helmets. Strangely enough, sunstroke may be common in one country and quite absent in another of the same latitude and sunshine.

Heatstroke is largely a matter of the body's faulty heat conditioning. When the heart is not above par, and particularly in closed rooms with stale hot air of high humidity, the regulation mechanism of certain persons breaks down. To protect against such an event, proper ventilation must be provided in tanks, engine rooms, and workshops; ample fluids must be supplied with enough salt to make up for the loss through sweating; and any possible heat congestion during marching due to unnecessarily heavy or too tightly fitting garments must be avoided.

But, by force of circumstance, diseases of the respiratory tract are still the primary problem of all diseases and on all theaters of war. Throat troubles, influenza, bronchitis, and pneumonia are

all uppermost in the public's appreciation, but unsung is the sinister rhapsody of the common cold. It seriously impedes doing effectively sustained work, it reduces general resistance, and paves the way to other maladies. The fighting men have usually suffered severe hardships—long, forced marches with insufficient shelter and sleep, with a lack of adequate water and food. With all this, and crowded together, they are an easy prey to contagion. The same applies to training camps, where explosive epidemics of children's diseases like measles and mumps are favored by the presence of many susceptible recruits.

More than any other single infectious disease, bubonic plague and cholera have in the past swept our globe in explosive epidemic form at various times. Today cholera still claims many victims in large parts of Asia and South America. Inoculations and isolation of cases can control a flare-up of epidemic proportions.

Bubonic plague has always spread from one of the five or six endemic centers in the world along the trade routes of grain. It is primarily a disease of rodents; when they die, their fleas seek other hosts. Coolies unloading grain cargoes, people hunting and handling small rodents and their furs, and inhabitants of densely populated waterfront districts, where rats abound, are the ones most frequently to fall ill. The control of bubonic plague must still be carried out through erecting ratproof buildings and periodically fumigating ships and grain silos rather than by attempts at mass vaccination.

#### VENEREAL DISEASES

Soldiers are not yet plaster saints. After having faced death, they are prone to overindulge in food, alcohol, and other dissipations. In the tropics, and especially under mobilization conditions, suitable sexual partners are few and far between, if one excepts prostitution in its narrower sense. Here promiscuity may make each infective case the focus for an explosive epidemic. For troops, the control of venereal diseases rests upon individual prophylaxis as well as on

preventing the diseased female carrier from spreading the infection. But sex cannot be abolished.

During the summer of 1917 the British Expeditionary Forces in France had, at times, as many as 23,000 hospital beds occupied by venereal-disease patients. That represents the manpower of two whole infantry divisions. Their average hospital stay was 46 days, so that the loss in fighting power reached the staggering total of 70,495,000 soldier-days per year. The American forces lost 6.5 million soldier-days during the Great War due to hospitalization of venereal-disease cases. In the American Expeditionary Forces in France, the venereal-disease morbidity in the disembarkation port of Saint-Nazaire was sometimes as high as twenty per cent. Similar examples could be given from most of the armies in the Great War. I vividly recall a number of instances where highly skilled and valuable men under my command fell ill, entailing serious loss to the combat units.

To give a present-day example: Vonderlehr of the US Public Health Service reports that among 1,070,000 volunteers and selectees recently examined there were altogether 48,500 active cases of syphilis, with only 1.85 per cent among whites but the enormous proportion of 24.12 per cent among Negroes. This shows that the sociological standard greatly affects the incidence of venereal diseases among different population groups.

#### "SPOTTY MALADIES"

One of the curious riddles of medicine is the regional occurrence of some diseases. Rabies (hydrophobia), for example, does not occur in Borneo or on the island of Bali. Kala-Azar, a protozoan infection of dog and man causing fever, enlargement of the spleen, and progressive emaciation, is widespread in British India and North China. But, mysteriously enough, it has never gained a foothold south of the Yangtze River, although soldiers and refugees have carried it with them.

Elephantastic enlargement of the legs is often observed in persons suffering from parasitic worms in the blood (filariasis) in New Guinea, the South Sea Islands, and certain regions of Africa. Yet it is absent for all practical purposes in adjacent tropical countries where apparently the same blood parasites abound and are transmitted by the same mosquito carrier.

Human sleeping sickness (trypanosomiasis) is endemic to Central Africa only. The malady called oroya fever or *Verruga peruviana*, important from the days when Pizarro conquered Peru up to the most recent warfare in the Chaco, is restricted to deep, hot valleys in the northern Andes. Yellow fever, whose mosquito transmitter, *Stegomyia fasciata*, is probably the most common mosquito in all hot climates, is strictly limited to a belt comprising the tropical parts of South and Central America—including the islands of the Caribbean—and the Atlantic border of Africa. To the esoteric cognate, President Roosevelt's order of over a year ago to inoculate the personnel of the US Marine Corps against yellow fever was of presageful significance.

#### COMPARATIVELY RARE TROPICAL AILMENTS

In justice to the tropics we must mention that some diseases are comparatively rare in those parts. Among them is typhus (*Typhus exanthematicus*). Its cause is the *Rickettsia prowazeki*, which is transmitted by body lice. But the louse feels happiest at a temperature of between 82 and 91 degrees Fahrenheit, which is that usually prevailing between the skin and the clothes in a cool climate. The louse does not care for the higher temperatures of the tropics. This is one of the reasons why typhus may show an increase in Shanghai and places with a similar climate when hot weather sets in: the louse feels uncomfortably hot inside and seeks other feeding grounds.

Diseases due to streptococci are the daily bread of any surgical dispensary in cool northern Europe or America, but the

army surgeon of any outfit in the tropics will probably be bothered far less by them. In fifteen years I saw fewer cases in Manila than I saw every month in Germany during my years as an interne and as a staff surgeon. The same applies to scarlet fever.

#### PROBLEMS OF DISTANCE AND SUPPLY

Because of the vast distances involved in World War II, vaster than in any previous war in history, the problem of satisfying the demands for all kinds of vital supplies is a never-ending challenge to the quartermaster corps. The stamina of fighting men is tremendously impaired if they lack sleep and are not adequately sheltered. But, in order to survive, water and food are more vital than arms, shelter, or clothing. Only those who have traveled in Africa, the Middle East, Burma, and such places can realize the magnitude of this task.

Far from the principal manufacturing centers of Europe and America, and particularly in the tropics, essential medical and dental supplies are as hard to replenish as other indispensable goods; and to repair medical apparatus properly is as difficult as repairing optical instruments, tanks, and guns. The requirements of modern methods of diagnosis and treatment further complicate the care of the sick or wounded soldier. Air transport has, in some instances, helped materially.

In this war it is essential to have large stocks of transfusion blood ready for treating shock and severe hemorrhage. This blood is more difficult to store in the tropics than in a moderate climate. No less than fifty per cent of the blood lost through injury should be replaced. The great demand for it is shown by London's figure of about 165 pints of fluid for a hundred air-raid casualties. Satisfactory management of wounds, burns, and fractures makes heavy demands upon medical and auxiliary personnel as well as on hospital space, so difficult to procure in primitive tropical areas. The same applies to radiology and elementary laboratories.

#### WEIGHING EVIDENCE AND COLLECTING DATA

War offers wonderful opportunities for mass experiments. When the individual life does not count, when money is of no importance, and when large-scale tests become compulsory for the common good, progress advances by leaps and bounds in every field.

In the Great War, the greatest advance was made by the technical sciences. Apart from diseases alone, in the sphere of Man and human relations chances of unparalleled dimensions are afforded for the study of human behavior under forced conditions, a study which would be strongly opposed in civilian life by all concerned, either because of sheer ignorance or ill-conceived ideology.

As was the case with cholera and typhoid fever during World War I, it is hoped that the protective value of preventive immunization against other diseases will be clarified.

Bacillary dysentery, even more than the amoebic form, is the great scourge of the hot countries. In the Philippines, prophylactic injections have been used by us for years with undoubtedly good results. The incidence from bacillary dysentery among the personnel of the US Asiatic Fleet going up to Chefoo in the summer was infinitely lower among those men who had previously been vaccinated with antidysonteric vaccine than in a nonvaccinated large control group of sailors and marines. This led to the adoption for general use of a mixed vaccine containing germs of cholera, typhoid fever, the paratyphoid fevers, and dysentery combined. In Shanghai this mixed vaccine has not yet been adopted.

The French in Indo-China have reported excellent results from the oral administration of specially prepared anti-cholera vaccine. Since the giving of preparations by the mouth is a great deal easier than by injection, the advantage in immunizing large numbers of people is obvious. Oral immunization against typhoid fever has so far been a failure. I know a good number of patients who

contracted it in spite of previous oral administrations, but I have hardly ever seen a case where the disease was contracted after proper injections.

The fairly strict surveillance of large numbers of men fighting in the tropics, and the possibility of a later check-up, afford further opportunities of studying the influence of malaria on syphilis. Beyond that, and generally speaking, the influence of any co-existing malady, and the effect of superinfection with another disease, upon the primary one are of considerable practical importance. Though surgery has always benefited most, war likewise affords for other fields of medicine the most severe test on the largest possible scale.

But let us state most emphatically that proper food and medicine are not enough. The maintenance of adequate health among troops in the extensive tropical warfare of today is possible only if a sufficient number of intelligent soldiers has been educated in the principles of how to keep healthy. It is futile to give simple instructions concerning the dangers of contaminated water and inadequate or tainted food, of mosquitoes and clandestine habits derogatory to well-being, if the morale of each soldier is not such as to keep unbroken vigilance. And caution is a virtue that soon stale.

#### TOTEMS AND TABOOS

There are many superstitions among all peoples and in all countries of the world. Troop contingents of different races and religions are a headache, particularly in certain tropical regions. To carry out the law of the Koran entails observing various restrictions. Neither food containing any flesh of swine nor any intoxicant is allowed. During the period of Ramadan, no taking of medicine between dawn and sunset nor even the minute cutting of the skin for a drop of blood for malaria examination is permitted. Another task is to provide enough water for ablution of hands,

mouth, and nose before eating and praying. No orthodox Hindu will eat or drink from containers touched by hands less exalted than of his own caste. The "untouchables" may not draw water from the same well as other castes. Only the Brahman touch is pure for all.

Officers of the British Plague Commission were assassinated not long ago when helping to control the rat pest during an outbreak of bubonic plague in India. They had dared to affront the Hindu god Ganesha, whose earthly vehicle is the destructive rat. And the dogmatic rule against killing any animal whatsoever in Hindu and Buddhist faith applies to all disease transmitters and poisonous snakes alike. Since the cow is particularly sacred, my orthodox Sikhs would never let me inject them with liver extracts made from the livers of cattle, so potent against the pernicious form of anemia. Many are the inhibitions man has placed upon man at times and in places.

#### CARE OF THE CIVILIAN POPULATION

Most cities in the tropics can scarcely meet the problem of air-raid shelters. The care of refugees and bombing victims becomes a crucial task. Famine, together with poverty and overcrowding, paves the way for disease. "Scorched earth" policy adds to the misery. Yet a minimum standard of health must be maintained among the general population at home and in occupied territories so that the health of the troops may not be endangered and in order that food and other supplies be produced and secured.

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Tariff barriers and passport quotas can strangle commercial and social intercourse between nations, but they can rarely control epidemics. The people on both sides of the fence should demand a special seat for Public Health and Sociology at the table of any future peace conference, and with some extra votes at that, lest the painful lessons from the years following the first World War are set at naught.

