SCIENCE NEWS

Science Service, Washington, D. C.

THE DISEASE PROBLEMS AFTER THE WAR

DISEASE and infection present gigantic problems to our armies fighting a global war, Professor K. F. Meyer, head of the department of bacteriology at the University of California, told the Western Section of the American Chemical Society. In wars, Professor Meyer pointed out, there has often been a much higher mortality rate from disease than from wounds. In the Crimean War, for example, there were 50 deaths from wounds to 192 from disease, while in the 1914–1918 World War the relation was 138 due to wounds and 115 from disease.

Not only is there the question of the health of the troops during the war, but of contacts among the home population when peace comes. When all these men come back, Professor Meyer said, we shall have carriers of all sorts of diseases. We must be prepared in civilian set-ups for possible eventualities. We remember that 1,000 people died of cholera in one month in Sacramento, Calif., during the '49 gold rush. The Army and Navy Medical Corps, working in conjunction with committees of the National Research Council, are developing every possible means of reducing the impact of these diseases to a minimum.

In the offices of the Division of Medical Intelligence there are on the walls maps of the world showing last minute data on the location of the various communicable diseases. Extensive outlines of the diseases likely to be met are prepared and given to medical officers before embarkation to the battle front.

In North Africa diphtheria appears in the form of skin ulcers which do not heal. In the caves of Tobruk there were sandflies and ticks that transmit fever. In Trinidad there are vampire bats. About 4 per cent. of these bats carry the rabies virus in their saliva. They bite the peoples' toes at night and the rabies appears as an ascending paralysis that looks in many ways like infantile paralysis. It was necessary that the bat population be reduced. This campaign and one against the mosquitos in that region were planned by the Medical Intelligence.

"Among the so-called 'filth' diseases, typhoid is licked since all troops get immunization," Professor Meyer said. But when our boys come home they may bring back dysentery in various forms." Dysentery vaccines are being studied but they are still in an experimental state. Sulfaguanidine has revolutionized the treatment. This disease will have to be controlled by environment, such as suppression of flies and proper disposal of excreta. This means continual vigilance.

We shall also have contact with cholera, Professor Meyer pointed out, since we are going close to the birthplace of cholera in the Ganges delta. There is a vaccine, but the degree of protection afforded is not definitely known. The Japs have used cholera vaccine since 1904. In fact, the best strain is a Japanese strain. The disadvantage is that revaccination is necessary every three months.

Among the insect-borne diseases we find malaria, which is more frequent in the tropics. This disease is not conquered. We need a real phophylactic. We now have only a suppressive, and a person may carry malaria for years in his blood. The control of this disease will have to be through control of mosquitoes. But how can any one prevent them from breeding in the hills, for example, of the Owen Stanley Mountains, or in West Africa? The medical officer can only see that the men sleep under mosquito nets and charge the atmosphere of the tents with insecticidal spray.

Against yellow fever the army has a vaccine which gives 100 per cent. protection.

Bubonic plague is always a possibility. This scourge has played an important role in many previous wars. It is insect-borne but once started may be passed from man to man in the pneumonic form. Both a vaccine and sulfa drugs may help fight plague.

Typhus is an ever-present threat. The British found typhus in Egypt. It is apt to be in any country where the population is louse-infested. "Some believe this can be handled by vaccination," Professor Meyer said, "but I have yet to be convinced."

In New Guinea, Sumatra, Burma, and Thailand there are mites that transmit a type of spotted fever similar to the swamp fever of Japan. In North Africa troops will probably experience similar diseases carried by ticks. In Central Africa we find sleeping sickness. To combat this we have a prophylactic, Bayer 205, which gives protection for three months.

There are also many other medical problems in a global war. In desert warfare heat-stroke must be dealt with, and sinus infections that tend to flare up. In the swampy battlegrounds there are liver flukes. In our army of eleven or twelve million men we shall find only the particularly fit individuals can be sent into certain regions. A great many who have been sent will have to be returned and replaced by others.

PENICILLIN AND GONORRHEA

RAPID recovery from gonorrhea in five patients who had not been helped by sulfa drug treatment was achieved by the new remedy, penicillin, is reported by Dr. Wallace E. Herrell, Dr. Edward N. Cook and Dr. Luther Thompson, of the Mayo Clinic, in the *Journal* of the American Medical Association.

Penicillin, which is obtained from common mold similar to that which grows on bread, is available only in limited amounts. It should, therefore, be reserved as a drug of last resort in treating gonorrhea.

Some strains of gonococci are so resistant to sulfa drugs that the patients fail to recover even with large doses and several courses of treatment. Laboratory tests showed that such sulfa-drug-resistant strains would yield to fairly small amounts of penicillin. The patients treated at the Mayo Clinic had been sick with gonorrhea for from five weeks to eleven months and had all had what would be considered adequate sulfa drug treatment. They began to get better within a few hours, in one case within five hours, after the penicillin solution started dripping into their veins, and in from two to four days were able to leave the hospital completely free of the infection. Lab-

oratory tests showed the germs had been banished in from 17 to 48 hours. The penicillin was given by continuous drip into the veins. No toxic effects or discomfort to the patient resulted from the treatment.

SYNTHETIC RUBBER PRODUCTION

SYNTHETIC rubber of the Buna S variety, good for tires all the way from jeep to super-bomber sizes, as well as for tank treads and other Army uses, will flow at the rate of 90,000 long tons a year out of a new plant set-up at Charleston, West Va., which has just gone into full-scale production.

Government-owned, the new installation consists of two separate but closely integrated plants, each under the management of a well-experienced industrial organization. The first plant, where the raw materials are produced, is managed by the Carbide and Carbon Chemicals Corporation; the second, where they are converted into the final product, by the United States Rubber Company. The two plants stand side by side, so that a casual observer would think they were one; short pipe lines carry the raw materials from one to the other.

Scarcely over a year ago, there was nothing on the broad, flat plain by the Kanawha River but farm and pasture land adjoining a small airport, near the suburban station called Institute, from the presence there of a state teachers' college. Now the place is an industrial giant, capable eventually of making rubber to rim 16,000,000 civilian car wheels every year.

Buna S is the synthetic rubber made by mixing two organic compounds, butadiene and styrene. Butadiene in turn can be made from either petroleum or alcohol; at this plant alcohol is used. The alcohol is brought up the river by barge or in railroad tank cars; it comes from the great Ohio Valley distilleries that have stopped making liquor to devote their entire capacities to war-alcohol production. A "tank farm" with a total storage capacity of 750,000 gallons insures a constant working supply on hand.

Styrene, the other ingredient, is made here by combining benzene and ethylene. Benzene is produced in abundance near by; it is a coke-oven by-product, and there are many coke-ovens in this valley. Ethylene is one of the lighter petroleum fractions.

Both butadiene and styrene must be brought to a high degree of purity before they can successfully combine to produce Buna S. At this place, the Carbide and Carbon Chemicals plant brings the butadiene to 98.5% purity and the styrene to 99% before putting them into the pipe lines to go over to the United States Rubber plant.

Both chemicals are limpid, water-clear liquids as they flow into the great mixing vessels. As soon as they are well in contact, however, they combine to form a milky fluid—a true latex, filled with billions upon billions of submicroscopic rubber particles.

These are held from combining with each other because all have electrical charges of like sign. The latex is flowed into another great vat, where a salt-water solution containing a little sulfuric acid is mixed in. The salt removes the electrical charges, and the rubber particles stick together in grains or crumbs. These are put through a mechanical shredder and washed thoroughly, to remove all chemicals that may still cling to them. Finally the raw rubber particles are showered down into the oblong mold of a powerful press, that squeezes them into 75-pound blocks. These are packed in cartons for shipment to the tire factories.—FRANK THONE.

ITEMS

EXPORTABLE quinine-bearing bark from the 17,000-acre cinchona plantation at El Porvenir, Guatemala, will be obtained under an agreement announced by the Board of Economic Warfare. A fourth of all Latin-American production is expected to come from El Porvenir. Guatemala is the only source that can supply the anti-malarial drug to this country by land route. A laboratory already has been established at El Porvenir for testing and analyzing bark and studies are being made of the different types of trees found there. It is hoped that a training program may also be undertaken to school people for work in locating and testing other cinchona stands in neighboring republics.

THE potato famine should soon be over. Commercial early potatoes from 363,100 acres of land are ready or soon will be ready for the market. It is an acreage 17 per cent. greater than the early potato acreage for 1942, and 16 per cent. above the ten-year average, 1932–41. Reports just made to the U. S. Department of Agriculture by its crop correspondents and field statisticians indicate the acreage in the states of Georgia, Kentucky, Maryland, Virginia and Kansas is 9 per cent. above the acres harvested in 1942, but is nearly 22 per cent. below the ten-year period. Arkansas, Oklahoma, Tennessee and North Carolina are expected to produce nearly 7,000,000 bushels, an increase of over a million bushels above the amount raised in 1942. The floods of the Arkansas and other rivers in Oklahoma and Arkansas have destroyed many acres of growing potatoes, but the increased acreage in other states will more than balance the losses.

ACCORDING to the Metropolitan Life Insurance Company "in this country as a whole, about six out of every 100 men and women of marriageable ages wed during a typical year." For the South, the figure has been almost nine out of 100, and for the Far West it has been somewhat under five out of 100. The North has been about halfway between. Now the West is having more marriages, especially in the ages under 35, while the South is having fewer. An increase in marriages among the older people and fewer marriages among younger ones is predicted for the future as a result of the war. The company also reports that the current death rate among white children aged 5 to 14 years is under one per 1,000. This is half the rate prevailing only a year ago. There is still considerable room for improvement, the statisticians point out. The five chief causes of death among children of school age are, in order of numerical importance: accidents, appendicitis, influenza and pneumonia, rheumatic fever and tuberculosis. Accidents cause more than a fourth of all deaths of school children in America. These can be prevented and the killing of children by the four diseases can be greatly reduced by further efforts to protect child health.