

MEDICINE

Medicine Goes to War

Europe's Conflict Finds Physicians and Surgeons Ready With Mighty Offensive Against Disease and Death

By JANE STAFFORD

THE WAR that is raging in Europe finds the "Men in White" probably better prepared than ever before to fight war-born pestilence and heal war-shattered bodies. From field and base hospitals during the last World War, from research laboratories and peace-time practice since 1918, have come many advances in surgical technic and in disease-fighting.

The World War that ended in 1918 was the first major war in which there were not very many more men killed by disease than by bullets. The picture, from this point of view, seems more promising today even than in the dark days before 1918.

Before then, one of the accompanying hazards of war were the plagues like typhoid fever and dysentery, which spread via contaminated food and drinking water. Typhoid fever can now be prevented by a sort of vaccination procedure. Doughboys of 1917 remember the "shots" which laid some of them up with sore arms and even a bout of fever for a few days, but which prevented the epidemics that took frightful toll of American troops in the Spanish-American War. The men in the laboratories have been working on anti-typhoid fever vaccination since 1918. For those who have once had the anti-typhoid "shots," there is a chance that revaccination—the protection does not last indefinitely but must be repeated—will be given in one dose with no sore arms or disability.

Sanitation Improved

Camp sanitation, moreover, has progressed to the point where the dysenteries can be, and in well-regulated armies are, practically eliminated.

Influenza and typhus fever were probably the greatest plagues of the World War. Scientists have never stopped fighting the war against 'flu. They have discovered that the cause of the disease is a virus, but attempts to prevent the spread of the virus or to develop a vaccine against it have not met with success so far. Only a few weeks ago Dr. Thomas Rivers, of the Rocke-

efeller Institute for Medical Research in New York City, president of the International Congress for Microbiology, said he expected another influenza epidemic if war is widespread and lasts long. And in the offices of the Surgeon General of the U.S. Army it is recalled that the respiratory diseases, influenza and pneumonia, presented the biggest health problem in the last war—aside from battle casualties.

"Whenever you bring a great number of men together, especially when many of them have been living in uncrowded, rural districts, you have this problem of the respiratory diseases," an army doctor explained.

The men from the country, though they may be healthy, strapping fellows, cannot withstand the massive doses of germs to which they have not been exposed before. Men from crowded sections of large cities have had more chance to build up immunity to disease germs, because of more frequent contact with small doses of them.

Serum for Pneumonia

While there is as yet no specific weapon against influenza, medical scientists have advanced far in their war against its frequent and dangerous sequel, pneumonia. Serum treatment for pneumonia, which has saved thousands of lives in recent years, was only beginning to be used during the World War. At the beginning of that war only about four of the 32 types of pneumonia germs were known. The entire 32 were not known and classified until after 1927. Each of these types is a separate disease-causing germ, and while the symptoms of the sickness they produce are about the same, serum for speeding patients to recovery must be made for each type of germ. Sera for all the types are now available and the production of these has been improved so as to make them more effective remedies for the disease.

Besides having serum for treating pneumonia, medical scientists have another brand-new and promising weapon, the famous sulfapyridine. Only a little over a year old, this chemical is credited with already having saved many pneu-

monia-threatened lives. Since it is much less expensive than serum to manufacture, and much easier to use, it may play an important part in reducing the danger of pneumonia in war or peace.

Best way of fighting any disease, of course, is by making men immune to it. For a few plagues, such as smallpox, typhoid fever, diphtheria and even yellow fever, this can now be done by vaccination or inoculation. Anti-pneumonia vaccine has also been developed. Many thousands of men and boys in C.C.C. camps in this country have been given this vaccine, apparently with good results, judging by the relatively few cases of pneumonia that have developed. Large-scale trials of the vaccine on civilians, who may be more exposed to the disease than the C.C.C. boys, are now planned. If American soldiers are sent into another war, it is possible that they may go vaccinated against pneumonia as well as against typhoid fever and smallpox, though Army officials have as yet made no decision on the use of anti-pneumonia vaccine.

Typhus fever is another of the deadly and loathesome plagues that soldiers of former wars have faced. It is quite a different ailment from the similar-sound-



MAGGOTS

A development of the World War was the discovery that maggots bred under germ-free conditions could be used to treat wounds. Now a substance, allantoin, has been found to take their place.



FOR THE MAIMED

Artificial limbs for those whose legs and arms are shot away are being made to fit better and prove more useful than ever before.

ing typhoid fever, and its germs are carried by lice. American soldiers in the last war were troubled enough by "cooties," but fortunately not many of them were in danger of getting typhus. De-lousing measures were used to keep the "cootie" population down, and since the men were free of typhus germs to start with, the "cooties" could not spread them.

Not so fortunate were the soldiers and civilians of other nations. In Poland and Russia and other Eastern European countries, the disease is endemic—that is, there are always some cases among the population. During the World War this sickness became a very real plague, ravaging troops and civilian populations alike in these countries.

The men in the laboratories did not cease warring on typhus when the Armistice was signed, but kept on searching for a way to make a vaccine against the disease. Ironically, two Polish scientists were on the verge of accomplishing this at the outbreak of the present war. The very week that German troops invaded their country, one of them, Prof. Ludwig Anigstein of Warsaw, was reporting his success in vaccinating guinea pigs at the International Congress for Microbiology meeting in New York City. American scientists also believe they have an effective vaccine, and if the war continues for any length of time, they

will have a tragic laboratory of human guinea pigs in which to test its value.

More cheerful to contemplate are the prospects of lives being saved from germs that get into wounds—either on the battlefields or on city streets when planes rain bombs on civilian populations. Gas gangrene, horrible and rapidly fatal infection, was a frightful scourge during the World War. Great numbers of the men wounded in trench warfare developed this infection and many of the wounded died of it. The germs form gas in the wounded tissues and also produce a very potent poison which enters the blood stream and spreads throughout the body. While the infection is essentially a war danger, cases occur in civil life in accidents in which limbs are crushed and there is opportunity for the germs to get in—for example, in cases of persons run over by automobiles in city streets.

Surgeons during the war treated the condition by cutting away as much tissue around the wound as possible and by treatment with antiseptic solution. If this did not help, amputation was resorted to in the effort to save life. Antitoxic serum has also been developed for fighting this deadly infection.

Newest weapon against this deadly gas gangrene is that medical wonder, sulfanilamide. This chemical remedy has, so far as is known, only been used in peace-time gas gangrene infections, but it is likely to play an important part in saving lives and limbs during the war. The speed with which the infection is brought under control by this treatment is "often startling," report doctors who have used it in peace-time practice.

A Preventive

They declare that all patients who have had crushing injuries should be given prophylactic doses of sulfanilamide as soon as they are seen, without waiting to see whether gas gangrene will set in, and such procedure may become part of the routine treatment of wounded in field hospitals and dressing stations and at city emergency stations for treatment of civilians wounded during air raids.

Another chemical that may prove highly valuable in treating infected war wounds is the substance called urea. A British scientist has already called his colleagues' attention to this remedy which was one of the few benefits derived from the World War. An American surgeon, Dr. William S. Baer, made the original discovery. He noticed that when

men wounded in battle had been lying out on the ground unattended for some time, their wounds commonly became infested with the larvae of certain kinds of flies. Strangely, these men whose wounds were literally crawling with maggots did not develop infections and recovered, although men whose wounds were promptly treated with the best aseptic technic to keep germs out of the wounds nevertheless developed infections. The maggots seemed to be especially helpful in cases where there was danger of osteomyelitis, or bone inflammation.

Back home after the war, Dr. Baer, who was an orthopedic surgeon seeing many cases of this bone inflammation in which the wounds would not heal under any kind of treatment, remembered the soldiers' wounds and their maggots. He decided to try the effects of maggots in peace-time wounds. It took courage to put crawling fly maggots, ordinarily associated with filth and germs, into patients' open wounds, but Dr. Baer did it, and found the treatment helped his patients to recover.

Unfortunately, he died before the action of the maggots had been explained. Meanwhile, other scientists had become interested. The Department of Agriculture had helped Dr. Baer by supplying him with maggots bred under sanitary conditions so that they were free of germs when put into the wounds. Scientists there continued working on the problem and discovered that the secret of the maggots' healing power lay in a substance they produced, called allantoin.

This chemical was finally synthesized and made available to surgeons in the form of a salve to be put on wounds instead of live maggots. It worked just as well. Further work led to the discovery that part of the allantoin molecule can be split off to form the chemical, urea, and that a two per cent water solution of this substance is as effective as allantoin or fly maggots. The advantage of using urea is that it is much cheaper to make than allantoin.

Blood Banks

Refrigerated blood—quarts and quarts of it—is another new, life-saving weapon that Army surgeons may take to the front with them, and that hospitals will have ready for civilians wounded in air raids. The blood will be examined to make sure it contains no dangerous germs, typed, and transported by army trucks in specially constructed boxes

that keep it at a temperature just above freezing. It will be ready for emergency use with no preliminary preparation other than warming it. Blood for this purpose can be obtained from civilians, from slightly wounded and convalescent soldiers, and from the dead. Such "blood banks," originally developed for saving lives of mothers threatened by child-birth hemorrhage and victims of peacetime accidents, proved their war value in Spain. French and British physicians months ago laid plans for blood banks that would withstand war-time runs, and other nations have probably followed suit. The feat of drawing life from the dead by saving their blood for transfusion into patients who would otherwise bleed to death was first accomplished by Prof. Serge Judine of the Institute Sklifasovskiy, Moscow's great emergency hospital.

The automobile and the air liners of peacetime have contributed their gruesome bit to medical knowledge which will be turned to war-time use. Automobile accident victims with broken legs and backs who died before they reached the hospital because they were improperly transported have been the subject of many a medical sermon in recent years.

A patient with a broken neck or back should be carried flat on a stretcher in an ambulance or truck. He should never be jack-knifed into the back seat of an

automobile, even if there must otherwise be some delay in getting him to the hospital. In spite of the delay, his chances of coming out alive are better.

Broken legs and arms should be splinted before the patient is moved from the scene of the accident, to keep the broken ends of the bones from damaging the tissues so badly that the leg or arm may be beyond repair and have to be amputated. It may not be possible to splint an arm or leg under shellfire, but the importance of splinting before moving is so well recognized that U.S. Army first aid equipment now includes splints for legs and arms.

War use of airplanes as ambulances for evacuation of the wounded has been much discussed, but except in exceptional cases such air ambulances are not likely to be used. Difficulties of landing planes anywhere near a battlefield and the chances of the air ambulances being mistaken for observation or military planes and consequently being shot down are reasons why these are considered impractical.

CHEMISTRY

Robot Chemist Analyzes Solutions And Draws Curve

A CHEMICAL robot that can analyze complex chemical substances faster and better than trained scientists was described at the annual Michigan-Ohio regional meeting of the American Chemical Society at Michigan State College.

Only a routine assistant is needed to help the robot make intricate quantitative chemical analyses, for the only care it requires is to be "fed" chemical solutions. Not only is the robot a super chemist, but it can write, too, drawing its results on a chart for later study by scientists.

Scientists H. A. Robinson, R. H. Briggs, R. W. Cermak and R. H. Boundy, all of the Dow Chemical Company, described the new machine which, to scientists, is known as an automatic electrometric titration apparatus.

Electrometric titration is a common enough technique of chemical analysis. Usually it is done by hand by adding small amounts of reagents to a solution and watching the voltage established across the apparatus as the solution's current flows. Each new voltage gives a

single point on a curve of final results. The whole process is time-consuming. The robot duplicates these acts, adding reagents in small amounts and recording the voltage on a graph automatically after each addition. Main advantage of the new apparatus is to remove the human element in the titration method. Little bumps on the curves take on new meaning when it is certain that there are no human mistakes and that the curves are made on apparatus which will duplicate results time after time.

Doctors have learned some ways of minimizing or eliminating the dangers civilian pilots have had to face in peacetime. Notable among these accomplishments in aviation medicine is the development of practical apparatus for supplying oxygen at high altitudes. Many war planes will probably be equipped with this new apparatus.

So much for protecting the men from disease and from loss of life and limb. There will still be, as there were in the last war, thousands who come back maimed, blinded and disfigured. Civilians as well as soldiers will face this fate if unprotected cities are bombed. There is some hope even for these pitiful creatures. Surgeons have perfected their skill, acquired in the last war, at restoring lost parts. Skulls, ears, noses, whole faces can be replaced or remade more skilfully than ever before and artificial arms and legs are better fitting and more useful than formerly.

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PSYCHOLOGY

Sophomores Pessimistic About Americans' Ability

A GLOOMY view of democracy is held by sophomores at the University of California.

A majority of the 350 sophomores questioned (62%) believe that about one American out of three is incapable of participating in a thoroughly workable democracy. Some are even more pessimistic. Half the public were declared incapable by 16% of the sophomores and 11% think three-fourths of the population unworthy of the democratic form of government.

Not so gloomy are professional psychologists recently gathered in Berkeley for a meeting of the American Psychological Association. Most of these authorities on the human mind (80%) agreed that nine out of ten Americans are quite capable of taking part in running the democracy.

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METEOROLOGY

Dry Year in Prospect For Sunny California

CALIFORNIA faces the prospect of less-than-average precipitation for the 1939-40 rainy season, the studies of Prof. George F. McEwen of the Scripps Institution of Oceanography indicate. Prof. McEwen's long-range forecasts are based on correlations of ocean temperatures and other factors with observed weather conditions several months later.