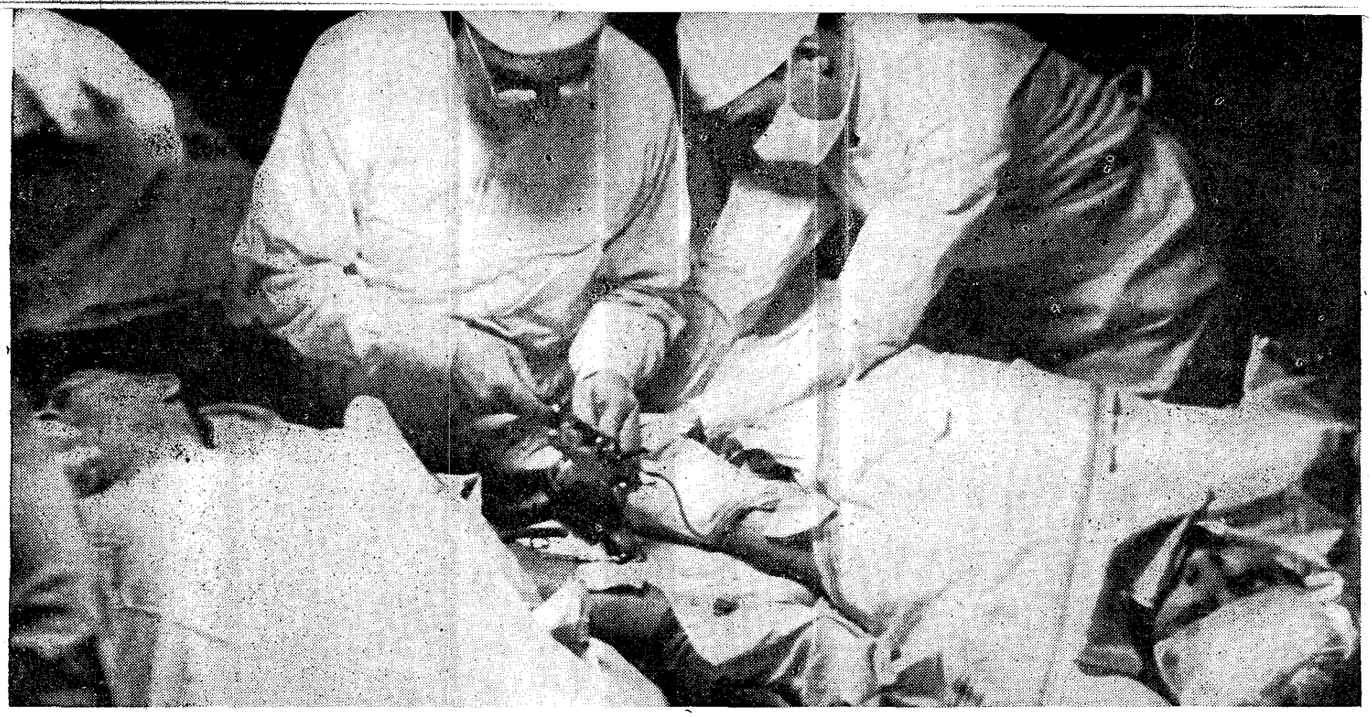

MIRACLE MEN

Here are some of the marvels military surgeons are performing every day. Sulfanilamide does it again. The "shrapnel locator" points the way.

WE ALL talk of P-40's, Spitfires, and tanks. Yet we sometimes forget that these machines are operated by men, and are specifically designed to protect the fighters. Every effort is made to wage war with least loss of life, and machines help accomplish this. Unfortunately machines are not perfect, and casualties must occur. It is because of this that medical science assumes a top place as a tool of war. For it is the function of medical science not only to protect men before they go into battle, but to treat them when injured and restore them for further battle or for normal life when peace comes.

Since the last war great advances have been made in medical science and practice, and these are being put to use as a tool in the present war. Infection, for example, ranks as a problem of first importance to the military surgeon, and it is easy to see why this is so. Every scratch, every wound opens up the way for invasion by bacteria. Any infection on the surface of the body can spread rapidly, and before long enter the blood stream to cause what we know as blood poisoning or septicemia. In the past, amputation of an arm or leg had to be performed to prevent septicemia from causing death. Various antiseptics were prepared to avoid this cruel treatment. During the last war Dakin's Solution—a chlorine compound—was widely used as an antiseptic. While it was fairly effective, it was very tedious to apply and required repeated and painful treatment.

Nothing better appeared until recently, when sulfanilamide and its derivatives made their miraculous appearance. These have proved themselves invaluable. At Dunkirk, where medical services were completely disorganized, wounded soldiers were simply given sulfanilamide pills by mouth, then treated in English hospitals. The number of infected wounds was remarkably low. Soviet reports on these drugs are equally glowing. Wounded men are given the drug by mouth. And where the wound is severe or extensive, the sulfanilamide or sulfathiazole is powdered into it, and the wound covered with a bandage. If the case is serious and needs immediate operative treatment—such as head, abdominal, or chest wounds—the soldier is given the drug and is then flown by plane to the rear where adequate hospitalization awaits him. Thousands upon thousands of lives are thus saved by a combination of powerful drug and speed.

The most recent report came from Pearl Harbor. One of the bright spots of this tragic episode was the preparedness of the medical corps. Several weeks before December 7 the medical commander had everything in readiness—bandages and medicines removed from warehouses, operating rooms ready, laundry trucks converted to ambulances, etc. On December 5, more than 300 civilian and military physicians attended a lecture on the treatment of war wounds. On the morning of December 7, they were again convening when the attack came. In twenty minutes the first wounded soldier was brought into the hospital, and immediately every doctor went to work. Speed and good organization saved many lives. The effectiveness of sulfanilamide and the sulfa compounds was again proved. Practically no infected wounds were seen even weeks after the attack; no amputations were performed because of infection; and no death from septicemia occurred. A remarkable record.

Improvements in surgery appeared, not only because of reduced danger of infection, but in actual technique. Many wounds are caused by shrapnel, and a real advance was made by the introduction of a "shrapnel-locator," a device invented by Samuel Berman, a New York subway worker. Formerly it was necessary to take many X-rays to locate the pieces of shrapnel, whether in the brain or other parts of the body. This was expensive, took a long time, and was not always accurate. The "shrapnel-locator" is both accurate and fast. It consists of a pencil-like apparatus which emits electro-magnetic waves. When the waves strike a metal, a deflection is observed on a meter to which the locator is attached. Not only will it locate the object on the surface, but it will tell accurately how deep the metal is. An improved model is now being manufactured in bulk.

OF ABOUT equal importance and requiring more immediate treatment than infection is the problem of shock, or collapse of the circulatory system. As a result of severe hemorrhage, extensive destruction of tissue, or intense nervous activity such as excruciating pain, the blood pressure falls to very low levels,

sometimes to zero. The pulse is so weak it cannot be felt. Insufficient blood is pumped out by the heart, and all tissues of the body suffer because of lack of oxygen and nutriment. The treatment of shock is an emergency measure, and all effort is directed toward restoration of the circulation to normal. And when a wounded person requires operative intervention, the element of shock represents a hazard of prime importance.

Besides general procedures such as keeping the body warm, administering morphine to relieve pain, stopping bleeding, etc., it has been found that replacement of body fluids by means of transfusion is the most effective form of therapy for shock. Until recent years transfusion was a laborious and messy procedure. The donor had to be present and his blood injected immediately into the patient. Frequently the blood would clot or there would be delays because of the wrong type of blood or clumsy organization.

Several years ago Soviet scientists devised a method whereby blood could be drawn from a donor and stored for several weeks before use. This was a tremendous advance. By this method large quantities of blood could be drawn in home cities and towns and delivered to the front as needed. This was first put into mass use during the Spanish civil war when the late Dr. Norman Bethune organized the loyalist transfusion service. The idea spread quickly and led to the establishment of blood banks in hospitals throughout the United States.

The next step was the development of plasma in transfusions instead of whole blood. Blood consists essentially of three elements—red and white blood cells, protein, and fluid containing minerals. If the cells are removed by high speed centrifuges, the remaining clear yellow fluid containing protein is called *plasma*. If the plasma is evaporated, a dry powder consisting of protein and salt remains. This is called *dried plasma*. The advantage of this is that it can be put up in very small ampules, avoiding bulk, and can last a long time. When needed, it is dissolved in water and transfused into the patient. Furthermore, human plasma is not necessary. Beef protein has been prepared so that it can be used in the very same way and as effectively. However, where there has been loss of blood, transfusion with whole blood is desirable. Suppose no stored blood or plasma is available at the front? Well, every man in the armed forces is typed at induction, and his blood type appears on the tag giving his name and address. Any soldier with the proper type can thus be called on to donate his blood.

THE third most important problem facing military medicine is that of burns. The weapons of modern warfare such as flame-throwers, incendiary bombs, etc., make this a very common injury. Burns can produce profound shock because of pain and tissue destruction, extensive infections, and deforming scars. Burns are treated by bathing in sodium bicarbonate solution to remove charred tissue, administration of morphine for pain, and the application of a tannic acid compound to protect the exposed areas from the dry air. Transfusion with blood or plasma is also necessary. Infection is prevented by cleansing before application of the tanning agent, and by use of sulfanilamide compounds. The deformity can be corrected later by the spectacular work of plastic surgery.

The use of tannate is interesting because it is the same substance used in tanning skins of animals to produce leather. It produces a thick protective layer which peels off in a couple of weeks, leaving newly formed skin underneath. Its disadvantage is that pockets of infection may form underneath which cannot be seen. Recently a thick paste of sulfathiazole has been used in place of tannate. No infection can occur in its presence, it is elastic and allows early movement of the burned part, and it is translucent, allowing some visibility of the underlying tissue and affected areas.

Men of the armed forces, put to difficult tasks, must be in good physical condition, and this means good nutritive condition. Not only have scientists discovered the importance of vitamins, they have also devised means of synthesizing them in bulk in the chemical laboratory. Applied to war, this is of great importance. For medical men are now in a position actually to *synthesize* battle or emergency rations on a sound basis. Capsules or cookies or biscuits containing every essential vitamin and mineral can now be prepared and fed to soldiers at the front where it is impossible to get complete meals. For the relatively short periods at the active front this is perfectly sound and helps to maintain good nutrition.

BY NATURE of organization and geographical disposition, our armed forces are exposed to types of disease not associated with bullets or shrapnel. Exposure to the elements, as well as crowding large numbers of men into confined areas, leads to such ailments as pneumonia, meningitis, influenza, and other infectious diseases. During World War I pneumonia accounted for most of the deaths among our sailors. At that time no specific measures were available to treat the disease, but today we have very effective agents. Sulfathiazole and sulfadiazine are extremely potent against pneumonia. Where additional therapy is necessary, specific serum is available. Similarly for meningitis. Against influenza there is as yet no specific therapy, and we must depend on maintaining the good physical status of our armed forces and civilians, and on adequate public health measures. However, considerable research is being done on influenza vaccines, and it would not be surprising if a good one were developed before the war is over.

Diseases related to geographical disposition are the so-called tropical diseases—malaria, amebic dysentery, bacillary dysentery, yellow fever, cholera, etc. Since a good deal of the fighting in the Far East is in areas infested by such diseases, they represent a problem of major importance. Against some of them—yellow fever, cholera, and typhoid—specific vaccines or preventives are available. Against bacillary dysentery, the new drug called sulfaguanidine has proved very effective. Quinine, a natural drug obtained from cinchona bark, is the old standby against malaria. However, a good deal of the quinine came from the Dutch East Indies, and in its stead synthetic drugs like atabrine and plasmochin can be used. Considerable research is in progress to discover drugs and vaccines to combat the tropical diseases.

Finally, there are the venereal diseases—syphilis and gonorrhea—which generally cause many casualties among the armed forces. By rigid public health measures and education, as well as prompt therapy, we will be in a position to eliminate most of the danger from these diseases.

IT MUST not be forgotten that the role medicine plays on the home front is as important as its role on the battle front. It is necessary that the home-front medical problems be attacked just as persistently and scientifically as in the armed forces. We know from many health surveys what serious deficiences exist on this score. It is depressing to be told that preventable illness among defense workers is costing us enough manpower to build 16,470 tanks a year. It is bad news to learn that industrial accidents are up ten to fifteen percent since 1940; that about half of us are suffering from some sort of poor health; that draftees in large numbers are still being turned down because of preventable infirmities. It is serious news to be told that tuberculosis death rates are increasing after a generation of consistent decline.

Yes, civilian health is an urgent problem—civilian health applied to war industry, civilian health applied to air-raid precaution, civilian health applied to the home. We need the same application of scientific methods and organization to our civilian problems as to our military. A sick and weak home front will lead to a sick and weak battle front. That is an axiom not to be forgotten.

PETER BOWMAN.

PROMETHEUS OF THE POOR

Karl Marx at home with his family and friends. His brilliant style as teacher and writer. The man whose genius illuminated the whole course of history.

May 5 was the 124th anniversary of the birth of Karl Marx. In commemoration of the birthday we are republishing excerpts from an essay, "Reminiscences of Marx," by his friend and student Wilhelm Liebknecht. Liebknecht, who died in 1900, was one of the leaders and founders of German Social Democracy. The essay first appeared in 1896.—The Editors.

THE friendship—with Marx's two eldest daughters, one six and the other seven years old—began a few days after I had arrived in London in the summer of 1850 from Switzerland. From that day I was at home in Marx's house and I never missed a day with the family.

Marx with his advantage of five or six years over us "young fellows" was conscious of the whole superiority of his ripened manhood, and he took every opportunity of testing us, and especially me. But he educated also, in regular fashion. I can say of him in a double respect, in the wider and the narrower sense of the words, that he was my teacher. And one had to follow him in every sphere. I will say nothing of economics. In the Pope's palace one does not speak of the Pope. Marx was at home in both modern and ancient languages. I was a philologist, and it gave him a childish pleasure when he could put before me some difficult passage from Aristotle or Aeschylus which I could not immediately understand. How he scolded me one day because I did not know—Spanish! In a moment he had pulled out *Don Quixote* from a heap of books and proceeded at once to give me a lesson.

In the years 1850 and 1851, Marx gave a course of lectures on economics. He only decided on it unwillingly; but after he had given a few private lessons to a small circle of friends, he allowed himself after all to be persuaded by us to give instruction to a larger circle. In this course, which was a great pleasure for all who had the good fortune to take part in it, Marx already unfolded completely the basic features of his system as it is to be found in *Capital*. In a crowded hall of the Communist League, or the Communist Workers Educational Union, which was then situated in Great Windmill Street—in the same hall where two and a half years before the Communist Manifesto had been decided on—Marx demonstrated his remarkable talent for popularization. Nobody hated vulgarization more than he did, that is to say the falsification of science, making it shallow and uninspired. No one, however, possessed in a higher degree the capacity of expressing himself clearly. Clarity of speech is the fruit of clarity of thought; clear thinking necessarily determines a clear form of expression.

Marx proceeded methodically. He put forward a sentence, as short as possible, and then he explained it in a longer exposition, taking the greatest care to avoid using any expressions which would not be understood by the workers. Then he called upon the listeners to put questions to him. If he did not get any, he began to examine and did this with such pedagogical skill that not a single gap or misunderstanding escaped him.

Marx is said to have had no "style," or a very bad one. That is said by those who do not know what style is—smooth-tongued speakers and phrase-mongers who have not understood Marx and were not capable of understanding him, incapable of following the flights of his intellect to the highest peaks of science and passion and to the profoundest depth of human suffering and human depravity. If Buffon's [illegible] holds good of anyone, it holds good of Marx: "The st[illegible] the man"—Marx's style is Marx himself. A man who was so thoroughly truthful as he was, who knew no other cult than that of truth, who at a moment's notice would throw aside propositions, however laboriously arrived at and dearly cherished, as soon as he was convinced that they were incorrect, could not but show himself in his writings as he was. Incapable of hypocrisy, incapable of pretense or posing, he always was himself in his writings as in his life.

It is true that with such a many-sided, wide-embracing, and varied nature, the style cannot be so uniform, unvaried, or even monotonous as in the case of less complex, narrower natures. The Marx of *Capital*, the Marx of *The Eighteenth Brumaire*, and the Marx of *Herr Vogt* are three different persons, and yet in their diversity they are the same Marx—in their trinity still a unit—the unity of a great personality which expresses itself differently in different spheres and yet always remains the same. Certainly, the style of *Capital* is hard to understand—but is indeed the subject dealt with easily comprehensible? The style is not merely the man, it is also the matter, it must adapt itself to the matter. There is no royal road to science, each must laboriously struggle and climb even when he has the best teacher. To complain of the heavy, difficult, incomprehensible, or even clumsy style of *Capital* is merely to acknowledge one's own laziness of thought or incapacity for thinking.

MARX could only become what he has become, in England. In such an economically undeveloped country as Germany was until the middle of this century, Marx could not have arrived at his critique of bourgeois economy and at knowledge of capitalist production any more than this economically undeveloped Germany could have had the political institutions of economically developed England. Marx was as much dependent on his environment and the conditions in which he lived as any other human being, and without this environment and without these conditions he would not have become what he is. No one has proved that better than he has himself.

To observe such an intellect while conditions operate upon it and while it penetrates deeper and deeper into nature and society—that is already in itself a deep intellectual enjoyment and I can never congratulate myself highly enough on my good fortune which led me as an inexperienced young fellow, thirsting for knowledge, to Marx and brought me under his influence and schooling.

Marx was one of the first who grasped the significance of Darwin's investigations. Already prior to 1849, the year of the publication of the *Origin of the Species*—by a remarkable coincidence also the year Marx's *Critique of Political Economy* appeared—Marx had recognized the epoch-making significance of Darwin who, far removed from the noise and bustle of the big city, was preparing on his peaceful country estate a revolution similar to the one Marx himself was preparing in the stormswept center of the world—only that the lever was applied at another point.

Particularly in the sphere of natural science—including physics and chemistry—and of history, Marx followed every new appearance, noted every progress: and Moleschott, Liebig, Huxley—whose "popular lectures" we conscientiously attended—were names as often occurring in our circle as Ricardo, Adam Smith, MacCulloch, and the Scottish and Italian political economists. And when Darwin drew the conclusions of his investigations and made them public, for months we talked of nothing else but Darwin and the revolutionizing power of his scientific achievements. I lay stress on this because "radical"