

FOREIGN MILITARY DIGESTS

Bacteriological Warfare

Digested by the MILITARY REVIEW from an article by Captain
Ambrosio P. Peña in the "Philippine Armed Forces Journal" March 1954.

IT IS MOST unfortunate that many misleading and exaggerated accounts on the consequences of bacteriological warfare have resulted in inaccurate, frightening publicity. The frequent, undue association of bacteriological warfare with the countless sudden deaths resulting from epidemics such as bubonic plague, cholera, dysentery, and typhus, has caused the average man to magnify the horrors of bacteria as a weapon in warfare.

There are horrors and dangers of bacteriological warfare. Very true. But these dangers are more imaginary than actual. It is, in fact, in the psychological effect upon the individual that the real danger lies. It is, therefore, the intent of this article to dispel the common thinking that bacteriological warfare is so horrible as to destroy mankind itself.

A Misnomer

At the outset, the term "bacteriological warfare" is misleading; it is actually a misnomer. The correct nomenclature should be "biological warfare," which is the deliberate use of microorganisms—

such as bacteria, fungi, protozoa, or toxic substances derived from living organisms—in the attacks on the susceptible man, animals, or crops, resulting in death or disease. The fact is emphasized that only the *susceptible* are likely to be victims of biological warfare.

Since biological warfare has never been employed openly, not much can be drawn from experience. There is, however, its reported employment against cavalry animals in Romania during World War I and in World War II, the Japanese were reported to have employed it in China. The Communists have also charged the United Nations command in Korea with employing biological warfare, but this was never substantiated. The curiosity or fearful anxiety caused by irresponsible and inauthentic talks on biological warfare may or may not find basis from the many researches made in this field by the leading military powers of the world.

Scientists have divided biological warfare into three parts, namely:

1. Attacks with living agents—such as insects and ticks, bacteria, viruses, and

other disease-causing microorganisms—intended to cause sickness or death in people, animals, or plants.

2. Attacks with special kinds of poisons called "toxin," produced by some organisms, most common of which are the plant-like germs called bacteria.

3. Attacks with special kinds of chemicals or synthetic substances known as artificial hormones, the so-called "growth regulators," intended to retard the growth or kill weeds and unwanted plants.

Agents

Almost all microorganisms, insects and ticks which are carriers of disease, toxins, and synthetic substances known to affect man, animals, and plants, are biological warfare agents. These agents have at least four main characteristics. Foremost of these characteristics is that many are beneficial—like yeasts which are needed in the manufacture of cheese and beer—while a few are capable of causing disease and death.

These agents breathe, eat, grow, multiply, and die.

They are susceptible to their environment and can thrive only with proper moisture, food, light, and temperature.

And finally, that which should negate the fearful aspects of biological warfare, these agents are easily destroyed by boiling or chlorinating water, cooking food, exposure to sunlight, and use of soap and water.

There are, indeed, numerous agents available in the conduct of biological warfare. However, the use of any particular agent—germs or poisons—would depend largely on what is hoped to be accomplished. If the intention is to kill a large number of people, then cholera, plague, smallpox, and typhus—which can spread rapidly—may be used. However, if the objective is to incapacitate as many people as possible—with the end in view of causing demoralization, shortage of pro-

duction, reduction of combat efficiency, and tying up doctors and hospitals—biological warfare agents which cause diseases with low mortality rates may be used. Especially productive of good results in achieving this end is to spread such diseases as rabbit fever, malaria, influenza, and undulant fever.

When the intention is to reduce the food supplies, biological warfare can be directed primarily against livestock, poultry, and food crops. Such diseases as anthrax, glanders, and rinderpest can be aimed against livestock; against poultry, fowl plague and the so-called "Newcastle disease" might prove successful. Against food crops, all kinds of plant plagues and blights might be used. For greater destructive effect, chemical growth regulators could be used to destroy food plants.

Dangers

When one reads of the "Black Death" in Europe in the fourteenth century where millions died; of Napoleon's retreat from Moscow with his ranks and files decimated badly by disease; of the fact that in World War I there were more casualties among the combatant troops from disease rather than from combat action, one becomes impressed with one thing: there is much death as a natural incidence of disease. If this is so, then it follows that if the disease can be spread deliberately through artificial means, the ensuing diseases and deaths would be most horrible.

Fortunately, there exist but few really serious dangers. One lies in the new methods used to spread old and known diseases. A large amount of experimentation has been done to develop these methods with the view to overcoming the effectiveness of countermeasures to biological warfare. And since the prime consideration would be the element of surprise and a high degree of secrecy, there would be no warning of an impending or actual biological warfare attack.

One of the most effective ways to spread disease is by dispersing germs in the air, in a similar manner as man spreads them by coughing and sneezing. Of the means and instruments of dispersion known in the military field, the ones that could be commonly used for biological warfare are artillery and mortar shells, bombs, airplane spray tanks, small bore ammunition, gas expulsion principle munitions, darts, free balloons, and land mines. All of these known war matériels can be specially designed so as to be filled with germs, toxins, and all known biological warfare agents.

The country that decides to conduct biological warfare against another will evidently do so secretly. In which event, fifth columnists could be infiltrated into the target area to pollute the water and food supplies. Specially trained agents could be utilized to saturate a specified area with cultured germs, or could put germs and poisons into the water mains. Individuals afflicted with highly communicable diseases, such as the tuberculars and the prostitutes, might also be employed for this secret work. Here, therefore, lies another great danger.

Death by the Millions

The nations which could be successfully subjected to biological warfare attacks are those with deficient technical know-how and those with unorganized or limited public health service systems.

Technicians, health personnel, and laboratory apparatus are needed to identify which biological warfare agent had been used by the attacker. Positive identification might take a week or two, and within this period it is likely that many would be infected. Woe to the nation, therefore, which has not been prepared to repel a biological warfare attack.

During the years immediately following the two world wars, there has been a lot of talk about new types of germs and poi-

sons being developed for use in biological warfare. These new germs and poisons are reputedly very powerful, and a thimbleful would be capable of killing millions of people in a short while. This, as well as a lot of other exaggerated talks, are just pure nonsense.

No germ or poison is so powerful as to be able to kill millions and millions of people at once. The truth about the matter is that there is a very serious type of food poisoning known in medical science as *botulism*, caused by tiny plant-like germs, or bacteria which creates a virulent poison if taken into the body through food or drinking water. Technically, toxin is any poison produced by plants or animals. In this specific case, however, *botulism* is caused by *botulinus toxin*, the appendage *botulinus* being derived from a Latin word meaning "sausage-shaped." The name *botulinus* was deemed most appropriate because it was discovered during an outbreak of food poisoning that came from eating spoiled sausages, and more so because the germs that produce the poison are shaped like sausages. It is also true that *botulinus* poison is about the most powerful poison that could be employed in biological warfare.

There has been too much exaggeration of the strength of this poison, which has resulted in frightening publicity. It originated during the last war when some laboratory technicians managed to segregate two types of *botulinus toxin* in almost pure form. Very tiny doses of these toxins were given to mice, which caused instant death. It was then mathematically and scientifically computed that an ounce of these toxins would kill around 840 billion mice. Then, by comparative weight of man and mouse, some dreamer—the highly imaginative fiction writer—concluded that just an ounce of *botulinus toxin* would be needed to kill 220 million people.

The conclusion may be true, yet it is

highly presumptive and not very practical or realistic. For one thing, science has no way of breaking down an ounce of *botulinus toxin*, or any toxin for that matter, into 220 million equal parts and distributing these parts to as many individuals.

Whatever germs, poisons, or other biological warfare agents are employed, their effectiveness is almost entirely dependent on suitable atmospheric conditions for the biological warfare agents to thrive; susceptibility of the objective to the disease being spread; and measures to prevent the attacker from being infected himself. Unless these conditions were fulfilled to the satisfaction of the attacker, biological warfare cannot be waged successfully. Fortunately—or unfortunately—these conditions cannot often be fulfilled. This should be heartening to people who have been most fearful that in some future war nations would resort to biological warfare.

The great strides made in the medical field are definite deterrents against the successful conduct of biological warfare. Doctors know an antidote for all of the germs, poisons, viruses, and synthetic substances that could be employed in biological warfare. This also should be heartening.

Above all, it is reassuring that any and all biological warfare agents are easily destroyed—either by manmade measures or by the natural elements. Once initiated, biological warfare attacks cannot necessarily spread rapidly and kill or disable numbers of people commensurate with the difficulties of initiating it.

A good case that comes to mind took place in New York City in 1947. One man with smallpox mixed freely with New York's crowds for several days. On being discovered, the city health authorities immediately vaccinated more than 6 million New Yorkers. Because of the measure

taken, only 12 cases of nonfatal smallpox resulted.

Some people and animals, because of either inherited or acquired immunity, are not susceptible to some diseases. For instance, the Negroid class is naturally immune to yellow fever, while the Algerian sheep is immune to the dreaded anthrax. It is of common knowledge that man can be immunized from most of the skin and intestinal diseases such as smallpox, cholera, dysentery, and typhus.

Protective Measures

Once it is established that your town or city has been subjected to a biological warfare attack, by following a few simple rules of hygiene and sanitation the disaster the enemy intended to create can be averted. Of all types of warfare, biological warfare is easiest to combat. These rules would do much to protect the individual:

1. Keep clean—germs have trouble living in clean surroundings.
2. Report sickness promptly to your doctor or public health authorities. You may not know that you, your plants, and your animals might have been infected after a biological warfare attack. Your doctor or public health service authorities would know.
3. Co-operate with your doctors or public health service authorities. Having been infected after a biological warfare attack, the agent may not be known. Your blood sample would help unlock the mystery. Take all immunization measures prescribed.
4. After a bombing raid, do not rush out of your protective cover unless you have a job to do. Remember, the enemy might have floated germs or toxins in the air following the bombing.
5. After a bombing raid by the enemy, it is best to assume he has subjected your locality to a biological warfare at-

tack. Food and water in open containers should, therefore, be avoided unless cleared as suitable for human consumption by a competent medical authority. In the absence of this clearance, play safe by chlorinating or boiling the water and cooking the food.

6. Do not help the enemy by starting or passing on to others rumors and wild stories about the horrors of biological warfare. Remember always that the real danger of biological warfare exists in the mind only.

As an added reminder, do not deceive yourself into believing the stories of the new "mystery" germs and poisons developed for use in biological warfare. They are pure nonsense. If an area is saturated with biological warfare agents, you can be sure there will not be as many casualties as if these cities had been the targets of hundreds of thousands of high explosive bombs. Experience has shown that the rifle and the artillery are, and will still be, the most effective weapons of war.

Morale

Digested by the MILITARY REVIEW from an article by Major General W. D. A. Lentaigne in the "United Service Institution Journal" (India) January 1954.

IT IS ONLY since 1946 that "Maintenance of Morale" has joined the select company of the Principles of War, and the word morale itself only entered the English language during World War I when the British and French—as major partners against Germany—traded jargon much as we all are learning "American" today and talking of "logistics," "task forces," and "communication zones."

Field Marshal Montgomery—when he listed "Maintenance of Morale" as a principle—did not define what the word morale meant, and there is no definition in any Army textbook. The Navy calls it the most important single factor in war, and defines morale as the general state of mind of a group of people as reflected by their behavior under all conditions. The Air Force says it is a mental state very sensitive to material conditions.

The definition that I propose to use is the attitude of individuals to their employment. And by *employment* I mean what they are doing at a particular moment of time. For instance, no matter who you are, and how high you may be on the crest of the wave, your morale is

definitely low at the moment when, sitting in the chair, your dentist approaches with a buzzing tooth drill.

Alexander's Army

So much for definitions. I would like first to give an example of bad morale. Over 2,000 years ago, Alexander of Macedon's Army, after overrunning half the world as known to the West, and as much *terra incognita* again, arrived at the Beas River. It was an unbeaten Army. It was led by a commander of the highest caliber. Its discipline was unequalled at that time. It was well fed and well equipped. Yet, when it reached the Beas River, a comparatively minor and unopposed river crossing, its attitude to its employment, or, as we call it, its morale, was so bad that it mutinied. In Air Force parlance, its mental state evinced the greatest possible sensitiveness to the particular conditions, while in the words of the Navy, their behavior in deciding to mutiny showed a generally bad state of mind. What single factor or condition, when superficially everything was going well, caused this bad morale? It was, of course,