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TRANSLATION

PROTECTING THE POPULATION FROM BACTERIOLOGICAL
WARFARE WEAPONS

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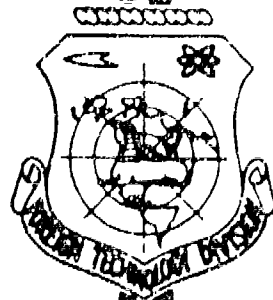
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FOREIGN TECHNOLOG DIVISION

AIR FORCE SYSTEMS COMMAND

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UNEDITED ROUGH DRAFT TRANSLATION

PROTECTING THE POPULATION FROM BACTERIOLOGICAL
WARFARE WEAPONS

BY: I. Bezdenzhnykh and Ye. Tyrkova

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From reports published abroad we learn of the life-destroying power possessed by bacteriologic weapons. These lethal effects are described in popular terms in the present booklet, aimed at a broad section of the reading public. Particular attention has been paid to the means and ways of protecting the civilian population in case of a bacteriologic attack.

FOREWORD

The Communist Party and the Soviet government have pursued unswervingly a policy of peace aimed at the prevention of war. The Party program adopted at the 22nd Congress of the CPSU contains this statement "Together with other socialist countries, as well as in cooperation with all peace-loving states and nations, we must seek every available means of preventing a global war. Conditions must be created that will forever banish the specter of war from the life of human society."

The great Lenin urged peaceful coexistence of states embodying different concepts of the social order. We have adhered scrupulously to this precept. Our country, along with other socialist states and peace-loving peoples, has been working consistently toward resolving some major international issues so that a lasting peace could be maintained. We have been urging a ban on all weapons of mass destruction, whether atomic, chemical or bacteriologic. Still, some aggressor circles in many capitalist countries have been evading the issue, under one pretext or another. They are pressing ahead with the armament race, while the international situation is steadily deteriorating.

Until the time comes when complete and universal disarmament has become a reality and war is gone forever from the life of Man, we dare not relax our efforts toward improving the country's defenses. Of utmost importance, in this critical task, is active cooperation of the people. They must be trained in time and properly organized if effective protection against bacteriologic weapons is ever to be achieved.

With the appearance of missiles carrying nuclear warheads the

threat of bacteriologic (biologic) warfare, in the minds of many individuals, has receded into the background. A very real danger still exists, nevertheless, that some aggressor circles in the imperialist states will use the deadly germs and their toxins as an instrument of war. This dreaded possibility must be reckoned with.

The properties and destructive power of bacteriologic weapons have by now been thoroughly explored. Effective remedies and protective measures have been developed. Both aspects of the matter are treated in the present booklet.

1. BACTERIOLOGIC WEAPONS AND THEIR USE

THE CONCEPT OF BATERIOLOGIC WEAPONS

When we speak of bacteriologic weapons, what we generally have in mind is the use of pathogenic microbes or their toxins, which are carried by various vehicles (rockets, missiles, bombs) and are expected to destroy human, animal and plant life. The authors of reports published abroad prefer a much broader term "biologic" weapons which, besides the virulent bacteria, implies further the use of bacteria-infected insects (ticks) and mammals (rodents). It is thus seen that bacteriologic, or biologic, war involves nothing less than deliberate spreading of infectious diseases -- a man-made epidemic planned in advance.

The enormity of destructive power associated with bacteriologic weapons is difficult to grasp if one has no idea of how the microbes function as pathogenic agents, and in what way the infectious diseases are transmitted from one man, or animal, to another.

Microbes are known to be the minutest living creatures, invisible unless viewed under a microscope at hundred-fold or thousand-fold magnification.

If the conditions are favorable, the microbes will multiply at a fantastic rate. It has been established that the single cell constituting a microbe divides into two daughter cells after a growth period averaging 15-30 min. Each of these cells, in turn, will likewise divide into two cells, following the same time interval, and so on. At this

rate of reproduction, calculations show, a single microbial cell will yield hundreds of millions of new microbe-cells within a few hours' interval.

As microbes reproduce, or perish, they release poisonous substances known as toxins. Some of these are so venomous that their toxic effect may prove lethal as they enter a man's body, even in negligible amounts.

Pathogenic microbes (causing disease) normally multiply in the living bodies of men or animals. Quite a few species are able to survive outside the body - in the air, water, food, as well as upon various objects - and will grow when placed in artificial nutrient media.

A pathogenic agent may be carried over from an infected organism into a healthy body by various routes. The pathogenic agents of the grippe (influenza), measles, diphtheria, etc. ("airborne" agents) are transmitted from the sick person to a healthy one through the air. The microbes causing dysentery, typhoid fever, cholera, and some other diseases, are transmitted through water, foodstuffs, household objects, contaminated hands and, occasionally, through carriers such as flies and other insects. The pathogenic agent of typhus is carried by lice and of malaria, by mosquitoes.

Available transmission routes, living conditions, timely contagious isolation, and many other factors determine whether a single individual or a number of healthy persons simultaneously will be infected by microbes transmitted from the patient. Especially rapid is the spreading of contagious diseases whose pathogenic agents can be transmitted through the air, water, foodstuffs, or carried by the blood-sucking arthropods (lice, fleas, mosquitoes, ticks, etc.).

The history of mankind abounds in tragic instances of infectious diseases spreading with appalling rapidity through such routes as de-

scribed above. In the past, erupting epidemics of cholera or the plague carried away millions of men. It is thus by no means a matter of coincidence that aggressor cliques in a number of capitalist countries have included the bacteriologic weapons in their armament programs as a powerful means of mass destruction, even though such weapons are both banned by international law and condemned by every progressive-minded man.

BACTERIAL AGENTS MOST LIKELY TO BE USED IN BIOLOGIC WARFARE

Under normal conditions, both men and animals contract a variety of infectious diseases. Research men working abroad believe that among the pathogenic agents known to induce the familiar ailments, some, but by no means all, can be used effectively as a bacterial instrument of destruction. In the opinion of foreign authors, pathogenic agents selected for the purposes of biologic (bacteriologic) warfare must be sufficiently stable, i. e., must possess a high degree of what is known as "military capability." Of particular significance among the various efficiency indices are pathogenicity (capacity for inducing disease exhibited by the microbe); ability to survive in the ambient medium; capacity for growth in artificial nutrient media; ability to induce a severe course of disease within a short interval after entering the human or animal body. Other essential properties that cannot be disregarded include, more specifically, a capacity for causing a rapidly spreading disease. The microbes displaying this tendency are in fact given preferential consideration. Other conditions being equal, the agents thought of as most effective are those that resist all means of specific prophylaxis (such as immunization) and are stable to modern therapeutic methods.

Disease agents affecting men, animals and plants have been investigated by research scientists abroad. Their conclusion was that sev-

eral categories of such agents could be effectively exploited as bacterial means of mass destruction. In the first group belong the agents of diseases affecting men only such as cholera, typhoid and paratyphoid fevers, typhus, Rocky Mountain spotted fever, pupugamushi fever, yellow fever, smallpox, and a number of other diseases. The second group includes pathogenic agents causing diseases in both men and animals, such as the plague, tularemia, brucellosis, anthrax, glanders melioidosis (false glanders), Q-fever, ornithoses, encephalomyelites in horses, foot-and-mouth disease, etc. The pathogenic agents included in the third group cause diseases affecting animals only, such as cattle plague (striking large horned cattle), swine plague, hemorrhagic septicemia of cattle, Asiatic false fowl plague, mycotoxicooses, etc. The fourth group lists agents causing diseases of agricultural plants such as rust of wheat and rye, tobacco mosaic and tomato mosaic disease, diseases of rice and cotton, and certain other afflictions.

A topic treated extensively in reports published abroad involves the botulism toxin and, to a lesser extent, other toxins of bacterial origin.

In recent years the possibility of using microbes with modified properties in biologic warfare has been pointed to with some emphasis. Analysis of published data confirms the feasibility of developing microbes with increased pathogenicity (capacity for inducing pathologic conditions), high ability to survive in ambient media (air, water, soil, foodstuffs, household objects, etc.), resistance to drugs and disinfectants, and so forth.

Worthy of mention is the suggested use of microbes in the form of mixtures prepared according to "prescriptions." A prescription, judging from data published abroad, may specify just a few, or a large number of agents causing various infectious diseases, along with toxic sub-

stances of bacterial and synthetic origin. It appears perfectly feasible that some formulas might prove effective containing nothing else but bacterial toxins. What has been said merits attention from various points of view. It is generally known that mixed infections follow a more severe course, are more often associated with complications, and show a higher incidence of fatal outcomes. Consequently, in a patient infected simultaneously with several pathogenic agents, or by agents combined with bacterial toxins, the illness may be expected to follow a more severe, and possibly inverted, course. This will make both diagnosis and identification (detection) of the pathogenic microbes far more difficult.

Modern microbiologic techniques enable us to accumulate both microbes and toxins in enormous amounts, and store them as liquids (suspensions) or solids (powders). Microbes are able to retain their properties longest when stored in a dried state.

For this reason the published reports stress the possibility of obtaining highly concentrated formulas which contain tens of billions of microbe bodies, of doses of bacterial toxins, respectively, per 1 ml or 1.0 g.

BACTERIOLOGIC WEAPON CHARACTERISTICS

The potential effectiveness of bacteriologic weapons, as of other instruments of mass destruction, is very high. We must consider, above all, that even minute quantities of such pathogenic microbes, or their toxins, will cause the development of disease in man and animals. Men will contract the plague, for example, when infected with just one, or a few plague microbes. It has been calculated that one cubic millimeter of ground chick-embryo tissues (which provide a medium for growing the psittacosis virus) contains the primary pathogenic agent in amounts sufficient for infecting several million men.

When evaluating the destructive potential of bacteriologic weapons, it is further necessary to bear in mind that many diseases are transmitted from man to man. The infected individuals may subsequently infect others, so that the infectious disease may become widespread under favorable conditions. That is why it is so important that everyone be made familiar with the first rules of isolating the sick, caring for them, and protecting oneself from becoming infected in turn.

Bacteriologic weapons are relatively stable and have a lasting effect. Cases of contracted infection should occasionally be put on record a long time after the use of bacteriologic weapons. The duration of effect is determined by a number of factors. It has long since been established that pathogenic microbes (those causing disease) are able to survive in ambient media for a relatively long time. A case in point where viability is preserved outside the body for a particularly lengthy period is that of spores formed by some microbes, notably the spores of anthrax, which are preserved in soil for several years. It is clear that consumption of contaminated water or foodstuffs, or contact with objects upon which viable microbes remain lodged, may lead to further infections after considerable time has elapsed following delivery of bacteriologic weapons. In many cases, stability of such weapons can be attained by protecting carrier insects (ticks) harboring the pathogenic agents so that they will remain viable.

A characteristic feature of major importance associated with bacteriologic weapons is the latent (incubation) period of induced disease. The same initial phase is present in infectious diseases developing under normal conditions. Many of us have learned from personal experience that a healthy child who comes in contact with another youngster afflicted with diphtheria, measles, whooping cough, or some other contagious disease, takes ill not on the same day but several days

later. Duration of the latent period varies for different diseases, and may be shortened or lengthened, due to the effect of some influencing factors.

The difficulty of diagnosing (identifying) the nature of disease and, further, of tracing the species of the particular microbe employed testifies significantly to the effectiveness of bacteriologic weapons.

METHODS OF DELIVERING BACTERIAL WEAPONS OF MASS DESTRUCTION

Thanks to the technical equipment at the disposal of modern armies bacterial means of destruction can be delivered to the target by aircraft, rockets, missiles, artillery, mine throwers, and other technical adjuncts.

A highly effective and plausible method of bacteriologic attack, in the opinion of foreign experts, might be based on contamination of the lowest atmospheric layers with aerosols containing some pathogenic agents of infection. This is no casual speculation. First, for one thing, microbes and toxins infiltrating the ground atmospheric layer may drift in dwellings and various structures. They may settle on topsoil, on plants, on surface areas of buildings; on clothes; on skin and exposed mucosa. They may find their way into water and foodstuffs. The slightest air current (light breeze; draft in closed premises) or shaking will dislodge them. Rising in the air, they will be drifting over an open area, or inside some premises. Second, bacterial means of destruction carried by air can work their way into the human or animal body in large amounts and within a short length of time. Third, a large number of individuals can be infected simultaneously through the air, by practically all pathogenic agents and toxins selected as bacteriologic means of destruction. Fourth, setting up an adequate defense against aerogenic (airborne) infection is a difficult task. Fifth, since airborne and toxins eventually land in water, foodstuffs and

other objects, both men and animals may become infected not alone by inhaling the contaminated air but also through the skin, exposed mucousa and the gastro-intestinal tract.

Some consideration has been given to sabotage activities, which many foreign experts believe to be a highly effective method of bacteriologic attack. According to some reports, undercover agents will be able to contaminate the air, water, foodstuffs, etc. Such acts of sabotage, it has been suggested, will be aimed at places where large crowds usually gather (railway stations, airports, great meeting halls, motion picture theaters, subways, bombing shelters). Other likely targets include industrial objects, sources of water supply (water mains, wells, small lake reservoirs, water tanks, etc.), warehouses used for storage of foodstuffs, and so on.

It is further known that infected ticks and other insects may be scattered from planes or by means of aircraft bombs of special design. At one time this method of bacteriologic attack was seriously considered by the Japanese.

During the Korean war, various types of infected objects were scattered from the air by Americans. Needless to say, the possibility of bacterial means of destruction being delivered simultaneously by more than one route cannot be ruled out.

TARGETS OF BACTERIOLOGIC ATTACK

Conflicting opinions have been voiced in reports published abroad concerning the more plausible targets of bacteriologic attack. According to some experts, bacteriologic weapons will most likely be directed against the civilian population, rather than the troops. Other authorities believe these weapons to be all-purpose tools of war, equally effective against field armies and the populace.

Bacteriologic weapons can be used effectively for crippling naval

and air bases, cities under siege, industrial centers, army camps, military training centers and agricultural regions. A bacteriologic attack is far less probable if the two armies are engaged in a direct encounter.

THE STRIKING CAPABILITIES OF BACTERIOLOGICAL WEAPONS AS DETERMINED BY VARIOUS INFLUENCING FACTORS

While bacteriologic weapons, because of their essential nature, can be used at any time of the year, they are most effective during the cold season. Microbes lodged on various objects are known to remain viable longest at low temperatures. For this reason alone the destructive effect should last considerably longer, hence the incidence of disease will increase among the population.

During the cold season, on the other hand, people spend more time indoors, where they are more vulnerable to a rapid spreading of infection. Pneumonic plague epidemics, to name one instance, break out most often during the cold season, apparently because people staying indoors come into closer contact with one another. A sudden increase in the incidence of some other infectious diseases is far higher in wintertime as compared with the warm seasons.

It is evident from the published data that the destructive power of bacteriologic weapons depends not only on the particular species of microbes used and their toxins but on their concentration in the air as well, which in turn is determined by the stability of the bacterial aerosol. The term, in this case, refers generally to a suspension of microbial bodies in air.

The stability of a bacterial aerosol is strongly affected by weather conditions, more specifically by the force and direction of wind, vertical stability of the air, and solar radiation.

The effect of the wind force (and direction) on the aerosol cloud

concentration requires no explanation. It is clear that a strong wind will more rapidly disperse the cloud. The situation suggests some similarity with the behavior of smoke. Everyone knows from personal observation that on a calm, windless day the cloud of smoke which forms when furnaces are on will hang over the houses, especially in a densely populated area located in a hollow. In windy weather, quite to the contrary, the smoke will soon float away, beyond the confines of the inhabited locality.

That the bacterial aerosol concentration is affected also by the vertical stability of the air is no less understandable. As fast as the warm air rises into higher atmospheric layers, the bacterial cloud concentration will decrease, at a comparable rate.

Air humidity is another factor that strongly influences the bacterial aerosol stability. Air having a high moisture content is more rapidly cleared of microbes.

The destructive power of a bacterial aerosol is affected also by such factors as terrain, solar radiation, etc.

One group of factors (low temperature, absence of wind and vertical air currents) may thus enhance the striking capabilities of bacteriologic weapons, while other factors (the presence of wind and vertical air currents, high humidity) will lower the same capabilities.

2. CIVILIAN DEFENSE IN BACTERIOLOGIC WARFARE

PRINCIPLES OF ANTIBACTERIAL PROTECTION

The combined prophylactic and antiepidemic measures now used in combating infectious diseases could also be resorted to for protecting the population from the effects of bacteriologic attack. These basic steps will have to be amplified, however, by such additional measures as might be required in a highly specific situation where a large number of people are being deliberately infected with pathogenic agents causing infectious diseases.

The following measures must therefore be adopted as the basis of antibacterial protection:

- 1) Applying available means of individual and group protection at the time of bacteriologic attack.
- 2) Mass immunization of the people, against the most dangerous infectious diseases in the first place.
- 3) Taking the necessary precautionary steps in sanitation and hygiene (above all, with respect to water supply, food and personal hygiene).
- 4) Determination (identification) of the species of microbes and toxins used.
- 5) Carrying out the necessary measures, without delay, in order to stamp out the foci of bacterial infection.

Prophylactic measures, if carried out in time, will counteract, or drastically limit, the effectiveness of bacteriologic weapons. A quarantine, or observation regime, must be imposed, however, if the

consequences of a bacteriologic attack are to be quickly remedied.

Both quarantine and observation have long since been used in fighting infectious diseases. The spreading of disease, experience shows, can be effectively confined to foci of infection by applying these measures. For this reason, quarantine is imposed by order of the Chief of Civilian Defense in the city (or district) immediately following attack, and even before the species of microbes used have been identified.

The quarantine is an administrative, medical sanitation measure designed to prevent an infectious disease from spreading. It is of critical importance in the case of some particularly dangerous infectious diseases which tend to spread widely among the population and show high incidence of patient's death.

It should be pointed out that the quarantine is often used to combat infectious diseases not in man alone but in animals and plants as well.

When a site of infection is placed under a quarantine, it is imperative that it be isolated (by setting up a sanitary cordon). No one is permitted to leave the area; admittance is drastically restricted. No personal belongings can be carried out unless thoroughly disinfected. Communication between separate groups of inhabitants in the quarantined area is placed under restriction.

If no bacilli of the plague, cholera or smallpox have been detected by identification tests, the quarantine may be replaced by observation; otherwise, it is to be continued until the focus of infection has been completely eradicated.

Observation is another medical sanitation measure, which however involves less rigid administrative (restrictive) regulations. People are allowed to leave or enter through checkpoints, the area containing the

site of infection. Communication between separate groups of inhabitants in the area is less restricted. In an area placed under a quarantine, for example, communication between men employed in different workshops is to be strictly proscribed, while it is permissible under conditions of observation. On the other hand, removal of any possessions from the area containing the site of infection, as in the case of quarantine, is allowed only following a disinfection.

The duration of quarantine, or observation, varies with the nature of infectious disease and the actual setup. Both quarantine and observation can be lifted if, after the last patient has recovered, a time interval has elapsed equal to the maximum incubation (latent) period characteristic for a given infection, and if the necessary antiepidemic measures have been carried out at the site of infection.

Quarantine and observation are most effective when imposed on a tightly organized community, where each and every individual follows conscientiously the recommendations of the medical personnel.

CIVILIAN POPULATION AS AN ACTIVE PARTICIPANT IN ANTIBACTERIOLOGIC DEFENSE

The idea of enlisting the cooperation of broad sectors of population in the fight against epidemics first came into existence during the early years of the Soviet State. It can be said without fear of exaggeration that at the time of the Civil War and foreign intervention, under conditions of an almost total dislocation, epidemics of typhus, smallpox, cholera and other diseases were successfully brought under control largely because the bulk of the population had been recruited for participation in the fight against infection.

A particularly impressive instance of the civilian population participating in an all-out effort to maintain sanitary conditions dates back to the years of the Great Patriotic War. The people had given

broad support to the efforts of the public health agencies in carrying out prophylactic measures and holding back the erupting epidemics of infectious diseases. Thus, despite the enormous devastation of cities and villages in the occupied regions, deliberate spreading of typhus by the German invaders, and wartime hardships, the country was spared an outbreak of epidemics.

In postwar years, thanks to the superior organization of the socialist state, the unsanitary conditions inherited from the war were quickly and effectively remedied. Today a successful campaign aimed at eliminating a number of infectious diseases is carried on with active cooperation by the citizenry.

During the years of Soviet rule, the participation by the people in the fight against infectious diseases has developed in many directions: community control of sanitary conditions in schools, public eating places, stores, dormitories, etc.; house-to-house inspection with a view to detecting cases of infection; community-organized clean-up of backyards and populated areas; maintenance checkups of water supply sources; general sanitizing campaigns; extermination of small animals dangerous in terms of transmitting infection, etc.

If citizen's participation has been essential in the peacetime fight against infectious disease, it should prove even more so in organizing the antibacteriologic defense. The need for such participation is dictated by the following considerations. First, under conditions of bacteriologic warfare it is necessary to thwart the enemy's attempts at deliberate spreading of infectious diseases. This is a far more complicated task than curbing the spontaneous appearance of infection under natural conditions. Second, an adequate civilian defense against bacteriologic attack is not feasible unless the population as a whole makes full use of both specific and nonspecific means of protection. It

is not by accident, therefore, that in the imperialist countries which have embarked on a course of unleashing a major war, training the population for civilian defense has become a matter of serious concern. Of some interest, in this connection, is the statement made by a prominent NATO official, John Hodsol, as he defined wartime responsibilities confronting the population. "Each family," Mr. Hodsol pointed out, "must be ready to take part in the national defense at the time of war, and should be trained for it right now, at the time of peace. "In case of war," he continued, "the participants (in the struggle: editor note) will be not only the contending powers but every individual family, as well. Our first line of defense is the home, the family, where the women can contribute significantly to the common effort."

The war experience in Korea and China bears witness to the importance of participation by the general public in antibacterial defense. Specifically, the Korean war has shown that such defense can be effective even under relatively unfavorable conditions. Thanks to the selfless courage displayed by the people of this country in carrying out an all-out drive against infectious diseases, the frequent flareups were never allowed to swell into a conflagration of vast epidemics.

In our country a vast array of ways and means designed to meet the threat of bacteriologic attack has been made available to the people. By timely and correct application of these methods, the effects of such attack can be sharply limited in scope, if not completely nullified. This is why every person should be familiar with available means and methods of antibacterial protection.

Such organizations as the DOSAAF (Voluntary Society for Citizen's Support of the Armed Forces), SOKK and KP SSSR (Allied Red Cross and Red Crescent Societies of the USSR), have enlisted cooperation of the general public in the training of Soviet citizens for civilian defense

against bacteriologic weapons. Anyone who wishes to do so can also learn all there is to know about such measures on his own, by consulting qualified medical workers. For best results, individual training should emphasize the following points:

- the use and properties of bacteriologic weapons;
- means of individual and group antichemical defense;
- improvised means of protecting the respiratory organs, vision and skin;
- methods for protecting the dwellings, water supplies and food-stuffs against the effects of bacteriologic attack;
- methods for disinfecting individual water and food supplies, household objects and the dwelling itself;
- procedures for complete or partial decontamination;
- methods for exterminating the arthropoda and rodents;
- instructions in caring for patients afflicted with contagious diseases;
- instructions in what is to be done after the civilian defense alarm has been sounded.

Needless to say, training in antibacteriologic defense cannot be limited to a theoretical study of some particular aspects of this vital problem. What is needed, in addition, is that a variety of practical steps be carried out simultaneously by the people themselves, through their own effort. (It should be seen to it, for example, that some means are always on hand for protecting the respiratory organs, vision and skin; various sanitation and hygienic measures should be implemented, etc.).

MEANS AND METHODS OF ANTIBACTERIOLOGIC DEFENSE

The means of protection against bacteriologic weapons are customarily divided into specific and nonspecific, and the latter into those

designed for individual and group protection.

The specific means include the vaccines, the immunizing sera, phages, antibiotics and chemotherapeutic preparations.

A vaccinated individual becomes nonsusceptible (immune) to infection, or the clinical course of disease is allayed. Immunization (vaccination) is now widely used with excellent results in combating various infectious diseases. In view of this, immunization has come to be considered an important factor in antibacterial protection.

It should be stressed that the success of timely nationwide immunization depends largely on the organized support of the people. With such cooperation, experience shows, mass immunization can be carried out within a short time.

Immunity does not develop immediately following vaccination but 2-3 weeks later. Injection of antiserum, on the other hand, produces an immediate, though not a long-lasting, prophylactic and therapeutic effect, for a one-month period at the most. In vaccinated subjects the immune period lasts from several months to a few years. In many cases of affliction caused by bacteriologic weapons, simultaneous immunization with vaccine and serum can be applied.

The use of phages, as of antisera, is restricted to just a few infectious diseases. Phages are more effective when combined with immune sera, antibiotics and chemotherapy.

Antibiotics and chemotherapeutic preparations are suitable not only for treating the sick but also for emergency prophylactics. An immediate administration of these remedies will often check the incipient development of disease in the infected subject, or will lead to a less severe course of ailment.

Thus, the specific means of antibacterial protection, if applied in time, will provide adequate protection for the individual citizen

(individual protection) and at the same time will prevent or limit the spreading of infectious diseases among the population (collective, or group, protection).

The nonspecific means of antibacterial protection are widely diversified.

Immediate infection at the time of bacteriologic attack can be prevented by expert use of antichemical defense methods designed for individual and group protection. Among the individual means of antichemical protection are generally included gas masks, means for skin protection, and antichemical kits. Gas masks of various designs will protect not only the respiratory organs but also the facial skin and eye conjunctiva.

The respiratory organs can also be protected by using respirators of the "Lepestok" type (The Petal) in combination with a cotton-gauze bandage (Fig. 1). Such a bandage is fashioned from a 125 cm long strip



Fig. 1. Preparing a cotton-gauze bandage.

of gauze 50 cm wide. A cotton layer of uniform thickness (2 cm), 25 cm long and 17 cm wide, is spread over the central portion of the gauze strip. The cotton is then wrapped in the gauze. The ends of the strip on either side are slit so that they could be tied. When a cotton-gauze bandage is put on, the lower strips are tied on the crown and the lower, in back of the head (Fig. 2). In emergencies, a square or triangular kerchief folded over a few times, together with the raised collar and flap of the coat, will provide short-time protection for the respiratory organs. Such improvised protection is more effective if a pair of goggles is available (Fig. 3).

Skin-protecting apparel is manufactured from various impermeable



Fig. 2. Cotton-gauze bandage correctly applied.

leather mittens and gloves. Women are advised to put on trousers.



Fig. 3. Cotton-gauze bandage, goggles and triangular kerchief protect the face, eyes and hair.

materials. This includes a cape, protective hose, gloves, rubber boots, apron, jacket and trousers, as well as special filtering garments. Any other suitable articles of clothing at hand may also prove useful, such as cloaks and capes made of oilcloth or chlorovinyl fabrics, overcoats, quilted jackets, footwear, including leather shoes and those made of leather substitutes, together with overshoes,

Children should be wrapped in sheets or blankets before they are removed from a contaminated area.

Effective group protection is provided by shelters, which are either built as separate structures, or are set up in basements, subways, mining shafts, etc. slit trenches, dugouts, building recesses, will also serve as crude temporary shelters at the time of air-raid combined with bacteriologic attack, but will provide no defense against the bacterial weapons if no individual means of protection

happened to be at hand.

Much importance, among existing methods of antibacterial protection, is attached to measures involving sanitation and hygiene. Many of these are simple and readily accessible. While such measures will not directly protect the local population at the time of bacteriologic attack directed from the air, they will subsequently help prevent infection transmitted through contact by hand as well as through water, food and other objects.

It is generally known that observing elementary rules of hygiene in everyday life (frequent washing of hands; regular washing of the

body, with change of underwear; reserving individual dishes and other

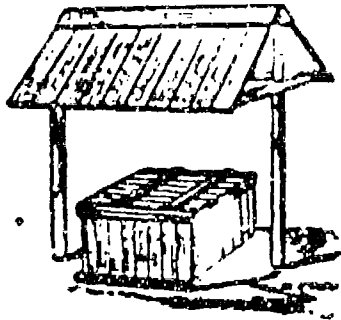


Fig. 4. Well protected by snugly fitted cover and shed.

household articles for personal use; keeping one's home and clothing clean) will limit the spreading of many types of intestinal infections, skin infections (itching, trachoma, mange), typhus, remittent fever, etc. This makes clear the importance of such measures under conditions of bacteriologic warfare.

No less obvious is the significance of sanitation and hygiene with respect to water supply service and protection of foodstuffs. A wide variety of infectious diseases can be transmitted through water. Especially dangerous is the contamination of some source of water supply serving a large number of people. In the past, hundreds, if not thousands, of individuals were stricken with typhoid fever and cholera within a short time, after drinking contaminated tap water. It follows that maintaining the sources of water supply in safe operating condition, storing water in covered containers, as well as disinfecting water by accessible conventional methods (boiling, chlorination) should be listed among effective means of antibacterial protection.

Foodstuffs provide another route by which infectious diseases may be transmitted. Under domestic conditions, food can be protected from contamination by various methods. Cereals, flour, bread and pastry, sugar and other loose, granulated or dry products, in small quantities, should be stored in glass jars or metal containers. Loaves of bread,

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of the area containing the site of infection.

The most widely used methods and means by which disinfection is carried out are listed in Table 1.

Outer clothes and undergarments, bed linen and other objects that can stand boiling and soaking in disinfecting solutions, can be decontaminated by one of these methods. Mattresses can be sprayed or rubbed with a 3% chloramine or lysol solution. Soft articles are most effectively disinfected by treatment in special chambers.

Footwear is best disinfected by rubbing with a 5% solution of lysol.

Walls, floors, ceilings can be disinfected by scrubbing with rags moistened with a 10% chloramine solution, a hot 10% lysol solution, or by spraying with these disinfectants. The treatment three times at 15-20 min. intervals. A reliable procedure for disinfecting ceilings and walls is white-washing twice with freshly made solutions of quicklime (unslaked lime).

Furthermore, depending on material (metal, wood, etc.) is disinfected by various methods. Upholstered furniture, for best results, is gone over with a vacuum cleaner, and then rubbed with a clean rag or a brush moistened with a 3% chloramine solution. Wood, metal or plastic furniture is sprayed and next rubbed with some disinfecting solution.

Objects of little value, rubbish, discarded odds and ends, sponges and rags used up in the disinfecting procedure, should be burned.

Dishes, rubber and plastic articles, can be disinfected by boiling or soaking in a solution of disinfectant.

Local population can be asked to participate in a general decontamination of the area, including buildings, installations and transportation facilities.

General decontamination of a populated area must begin with places



Fig. 7. Walls decontaminated by rubbing with rags moistened with a disinfectant solution.

where the basic vital activities are carried on (backyards, streets, public squares, business districts harboring stores, warehouses, industrial establishments, medical centers, etc.).

In the warm seasons the area is decontaminated with a 20% solution of chlorinated lime (2 kg in a pail of water) or with a 10-20% solution containing two-thirds basic salt, calcium hypochlorite (TTS-CH). When infection is caused by nonsporulent microbes, a 20% solution of chlorinated lime (milk), or a 10% TTS-CH solution, is used, 1 liter per 1

sq. meter of area. If sporulent microbes are the cause of spreading infection, chlorinated lime, or a 20% TTS-CH solution is applied, 2 liters per 1 sq. meter. On windless days the contaminated area is sprinkled with dry chlorinated lime, 0.5 kg per 1 sq. meter, and subsequently hosed, 1 liter of water per 1 sq. meter of area.

Unpaved ground can in many cases be decontaminated by lifting a layer of topsoil 3-4 cm thick with a spade, or to a depth of 7-8 cm using a bulldozer. The excavated dirt is carted away and dumped outside the populated district limits.

Disinfection of toxins is performed with the aid of 10% solutions of sodium hydroxide or sodium sulfide. Both kinds of solutions, it will be kept in mind, eat away the skin, destroy fabrics and damage footwear. Their effectiveness is not affected by cold weather.

During the winter season contaminated areas are disinfected with a 50% solution of sulfuryl chloride or a 10% dichloramine solution in dichloroethane, using 1 liter per sq. meter if nonsporulent microbes



Fig. 8. Ceiling disinfected by wiping with rag moistened with disinfectant solution.

are the cause of infection, or a double amount

in cases involving sporulent microbes.

Microbes lodged on surface layers of snow can be removed by mechanical means. If the snow is compact, a layer 3-4 cm thick may be removed, but loose snow should be lifted to a depth of 2 cm only. The removed snow is likewise carted away to dumping grounds outside city limits.

Exposed areas in buildings and various structures should be disinfected in spots with which men may come in contact. The walls

are sprayed with 10% solutions of chloramine, or chlorinated lime,

three times at 15-20 min. intervals, using each time 0.3 liter per sq. meter of sprayed area.



Fig. 9. Vacuum cleaning of furniture.

Microbes can also be washed off the walls by hosing them with water under strong pressure. In such cases, following the operation, the ground adjacent to the building should be decontaminated with a disinfectant solution.

Platforms of special design are used for decontaminating transport facilities. If infection has been traced to some nonsporulent microbe species, the disinfectants used in warm seasons are 2-5% clarified solutions of chlorinated lime, 3% chloramine, or 5% lysol. In winter a 10% solution of dichloramine in dichloroethane is used for the same purpose. Sporulent microbes are rendered inactive with a 10% solution of chloramine in 17-20% formaldehyde. Contaminated areas are first sprayed and then scrubbed with brushes or wiped with rags soaked in



Fig. 10. Disinfection by means of pressure hose.



Fig. 11. Disinfection of dishes and other articles by boiling.

disinfectant.

Water from nonsheltered reservoirs, open wells and uncovered containers (pails, tanks, barrels, and the like) must be decontaminated before it can be safely used in wartime. The most reliable procedure for decontaminating both water and containers in which it is stored is boiling for not less than 30 min. Within this length of time the bacterial toxins will have decomposed, and no surviving sporulent microbes will be found.

Food stocked up in the house requires different decontamination methods, depending on its kind and the way in which it is packaged.

Canned food in metal containers or glass jars is fit for consumption after the containers have been decontaminated. This is done by placing the containers in cold water and bringing it to boiling, which is continued for 30 min. Metal containers can be immersed directly in boiling water.

Metal or glass containers, as well as packaging made of synthetic film, cardboard, heavy paper, or wood (barrels, boxes), are disinfected by rubbing three times (at 15-20 min. intervals) with a 5% chloramine solution or a 5% clarified solution of chlorinated lime. After rubbing with disinfectant, the containers would be washed with hot water. This does not apply to paper and cardboard wrappers, which are burned. When such wrappers are removed, care should be taken that their outer surfaces do not come into contact with the goods.

Foodstuffs stored in the open, unpackagea, are decontaminated by boiling. This method is suitable for disinfecting meat, fish, fats, sugar, salt (the latter to be used as salt water, or residue following evaporation), and some other products. Considerably more complicated is the procedure involved in disinfecting bread. If the possible presence of sporulent microbes and toxins is ruled out, the bread loaves can be sliced and thoroughly dried in the oven or stove. Otherwise the bread must be soaked, boiled and a new loaf must be baked using the pulpy mass obtained. The medical personnel must be consulted in all such cases.

The various means of individual protection (gas mask or cotton-gauze bandage, goggles, smock, gloves, rubber boots, or any other type of footwear with overshoes) should be used in order not to become infected during decontamination of the premises, furniture and other objects. When the operation has been completed, the protective apparel is disinfected, and every person participating in the decontamination is subjected to full sanitaring treatment.

In many cases disinsection (extermination of insects) and deratization (extermination of rodents) are necessary in addition to disinfection. It is a matter of common knowledge that many insect species (lice, fleas, flies, mosquitoes, etc.) are carriers of contagious diseases. It follows that disinfection should prevent transmission of infection from the sick to some healthy individuals.

The extermination drive against insects must be carried on at all times, whether or not the emergence of some infectious diseases is in evidence. Extermination should be backed up by sanitation and hygienic measures taken simultaneously.

Measures involving elementary sanitation and hygiene (taking a steam bath at least once in 7-10 days; keeping the home and adjacent

TABLE 2

Disinfectants and Methods of Application

1	2	3	4	5	6	7
Disinfectant	Form	Concentration	Method	Disinfectant	Form	Concentration
DDT	10% dust		7 For underwear, bed linen and other garments, dusting is done from the inside to exterminate flies, fleas, mosquitoes, bedbugs and other insects indoors, the insecticide is simultaneously rubbed into the parts of the body covered with hair.	21 Gencaloron (GKSP)	22 6 pers. dust	23 25
5	6		10 For exterminating insects on the body of the infested person, the insecticide is rubbed into the parts of the body covered with hair.	11	24 30-40% emulsion	25 For treatment of the body of the infested person, the insecticide is rubbed into the parts of the body covered with hair.
8	9	0.1-3	12 Soak underwear for 30 min., wring out, fluff-dried and lightly pressed; outer garments are sprayed or rubbed with disinfectant.	11	26 Clean powder	28 For exterminating insects on the body of the infested person, the insecticide is rubbed into the parts of the body covered with hair.
	11	1-2	14 The body is washed; underwear is washed; bed linen, walls, furniture, etc., are gone over with pencil, drawing lines spaced up to 4 cm apart.	11	27	30 In addition, insects on the body of the infested person are destroyed by spraying the ground with disinfecting agent, 0.1-3 g per 1 sq. meter; indoors, 2 g are used per sq. meter of infested area.
	13	1-2	16 The body is washed; underwear is washed; bed linen, walls, furniture, etc., are gone over with pencil, drawing lines spaced up to 4 cm apart.	11	29 Emulsion	30 Soak underwear for 10 min., wring out, fluff-dried and lightly pressed; outer garments are sprayed or rubbed with disinfectant.
	15	18	18 Under and outer garments, bed linen, walls, furniture, etc., are gone over with pencil, drawing lines spaced up to 4 cm apart.	31	32 Powder	33 Rubbed into the parts of the body covered with hair.
	17	20	20 One liter of 1 liter capacity is consumed in treating 560 sq. meters indoors.	34	35	36 Rubbed into the parts of the body covered with hair.

Name of preparation; 2) form in which it is put on the market; 3) concentration of the preparation in working solution, %; 4) method of application; 5) DDT; 6) 10% dusting powder; 7) underwear, bed linen and other garments are dusted on the inside to exterminate flies, fleas, mosquitoes, bedbugs and other insects indoors, the insecticide is simultaneously rubbed into their settling places with a hand or backpack duster; 8) same; 9) 20-50% paste-emulsion; 10) insects infesting the body of the infested person are destroyed by rubbing the insecticide into the parts of the body covered with hair; 11) same; 12) undergarments are soaked for 30 min., wrung out, fluff-dried and lightly pressed; outer garments are sprayed or rubbed with disinfectant; 13) 40-65% emulsified suspension; 14) same; 15) DDT soap; 16) the body is washed; underwear is washed; bed linen, walls, furniture, etc., are gone over with pencil, drawing lines spaced up to 4 cm apart; 17) insecticidal pencils (70% DDT); 18) under and outer garments, bed linen, walls, furniture, etc., are gone over with pencil, drawing lines spaced up to 4 cm apart; 19) Freon cylinders; 20) one liter of 1 liter capacity is consumed in treating 560 sq. meters indoors.

doors, or the same area under vegetation; 21) hexachloran (HCCH); 22) 6% dusting powder; 23) applied similarly to DDT dust; 24) 20% mineral oil emulsion; 25) 2-3 g of disinfectant per 1 sq. meter of infested area indoors; seldom used to disinfect underwear top garments; 26) naphtha solvent; 27) pure preparation; 28) household objects are sprayed and placed inside a bag or a tightly closed box for 8-10 hours in order to destroy the insects; infested area is sprayed and the premises are locked for 3-4 hours; 29) soap-solvent paste (65 parts solvent and 35 parts green soap); 30) underwear is first soaked in a 10% hot solution of the emulsion for 20-30 min., and then laundered; 20% solution of the same emulsion is rubbed into skin areas covered with hair; the application is washed off 15 min. later; 31) Pyrethrum; 32) powder; underclothes, bed linen, outer garments are dusted on the inside; in infested area of the premises is dusted likewise; 34) fleacide; 35) in infusion of chamomile flowers in alcohol; 36) sprayed over insect-infested areas.

TABLE 3
Rat Poisons

Название препарата 1	Внешний вид 2	Содержание яда, % (от веса препарата) 3	Способ введения препарата в приманку 4
Крысид 5	Порошок серого цвета 6	До 1 7	Смешивают с хлебными крошками, фаршем из мяса или рыбы. 8
Фосфид цинка 9	Порошок темно-серого цвета 10	3	Смешивают с хлебными крошками, фаршем из мяса или рыбы. Воду или молоко на расчете 500 мг препарата на 100 кв. см водной поверхности. 11
Сернистый 12 сульфат	Порошок белого цвета 13	3-4	Смешивают с хлебными крошками и другими пищевыми продуктами. 14
Морской лук 15	Желтый аморфный порошок 16	30	Смешивают с одним из пищевых продуктов или предварительно приманку и поливают ее луком. 17

1) Name of chemical; 2) external appearance; 3) poison content, weight % of bait; 4) method of mixing chemical with bait; 5) "Krysid" (rodenticide); 6) gray powder; 7) up to 1%; 8) mixed with breadcrumbs, chopped meat or fish meal; 9) zinc phosphide; 10) dark-gray powder; 11) mixed with breadcrumbs, ground meat or fish meal; water is dusted using 500 mg of powder per 100 sq. cm. of water surface; 12) thallium sulfate; 13) white powder; 14) mixed with breadcrumbs or other foodstuffs; 15) sea onion (*Urginea scilla*, or squill); 16) amorphous yellowish powder; 17) mixed with some type of food, or else the bait is impregnated with an infusion of sea onion.

grounds clean) are in themselves sufficient to keep out lice, fleas, flies and roaches, or to limit their numbers. Mechanical, physical, chemical, or combined methods are used in fighting the insects.

The mechanical methods (beating, shaking, laundering, removal of dust and refuse, area cleanups) are of particular importance in getting rid of flies and fleas infesting the household. Window screens and door screens, or gauze, will keep out flies, gnats and mosquitoes.



Fig. 12. "Squasher" with platform for bait.

Stray flies are best trapped by means of fly-paper.

Boiling and ironing are the two physical methods most often used to destroy lice and fleas infesting underclothes and bed linen.

Bedbug-infested wallpaper stripped from the walls, rubbish, insects poisoned with insecticides, are destroyed by burning.

A wide variety of chemicals are used against the insects. The properties of the most extensively employed disinfectants are given in Table 2.

A combination of various methods is often used to rid the household of insects. Thus, mechanical and chemical means may be applied simultaneously.

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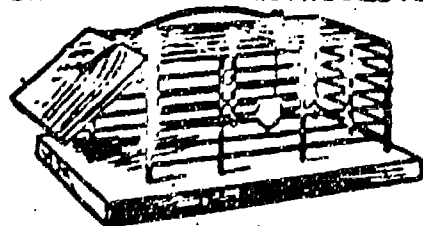


Fig. 13. "Squasher" with platform for bait.

Various repellents such as dimethyl phthalate have been widely used in recent years to provide protection from insect bites. The repellents are applied to the skin of the face, neck, arms and legs.

They are also smeared on the collar, inside the lower part of sleeves, skirts, trousers, or else are used to impregnate protective nets. When thus applied,

they will protect the user from insect bites for several hours.

Deratization is accomplished with the aid of mechanical devices (traps of various designs) and by means of chemical preparations. Other methods are less often used. Extermination gives better results when combined with prophylactic steps (fixing cracks and holes in the floor; storing foodstuffs and water in ratproof containers; weekly cleanups of basements and other rodent-infested areas; regular removal of refuse and litter).

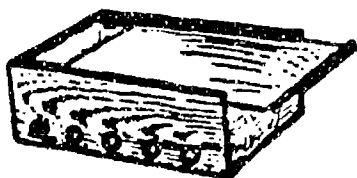


Fig. 14. Boxes holding poisoned bait.

The spring trap and similar self-operating devices are the mechanical means most often used for getting rid of the household rodents.

Chemical preparations are generally used in the form of poisoned bait. The chemical is mixed with the kind of food preferred by the rodents. The bait is distributed through areas

frequently raided by the animals. Basic data on chemical poisons used in the extermination of rodents are listed in Table 3.

Bait containing chemical poisons is freshly prepared before use. To bait consisting of breadcrumbs, 0.25% vegetable oil (by weight of bait) should be added for best results.

Sanitizing treatment may be either partial or complete, depending on wartime conditions.

Partial sanitation treatment is carried out by the infected individual himself, immediately following bacteriologic attack. Such an operation effectively removes injurious bacterial agents from all exposed parts (face, neck, hands) as well as from parts of clothing that are likely to be touched by the infected person. Partial sanitizing

treatment includes the following consecutive steps: the face, neck, hands, then clothes and shoes, are wiped with a rag (or pocket handkerchief) moistened with the disinfectant carried in one's individual antichemical kit. Washing the exposed parts of the body with soap and water is less effective, as is also cleaning the clothing using mechanical means, without a disinfectant.

Over-all sanitation treatment includes decontamination of exposed parts with disinfectant, washing with soap and hot water, disinfection of under and outer garments and shoes, as well as of the individual protective articles, which are treated in stationary or mobile chambers.

Permanent lavatory stations have been organized, where complete sanitation treatment can be performed.

In communal apartments accommodating several tenants, complete sanitation processing is possible if a bathtub or shower is available. Contaminated household objects are packed in bags and shipped to disinfecting chambers.

HOUSEHOLD MEANS OF PROTECTION AGAINST BACTERIOLOGIC WEAPONS

The primary units, or cells, to be protected against bacteriologic attack are the living quarters - an apartment, house, dormitory - the industrial plants and factories, institutions, government agencies and schools. The housewives, adolescents, retired persons, can do much in the way of protecting the common dwelling.

Important protective measures, under average household conditions, include maintaining the cleanliness of the dwelling, observing the rules of personal hygiene (washing the hands with soap after work and before each meal; washing the body at least once in 7-10 days, with change of underwear and bed linen; brushing the street clothes and wiping the shoes before coming into the house); maintaining all sources of water supply in good working order; storing food where flies and rodents could

not get at it; backyards cleanups; systematic extermination of rodents and insects by any method available. As pointed out earlier, sanitation and hygienic precautions, under peacetime conditions, prevent infection and curb the spreading of many infectious diseases.

Experience gained in fighting contagious diseases indicates that sanitation and hygienic measures bring good results when combined with immunization. Not only do prophylactic vaccinations provide a valuable adjunct to sanitation and hygiene, but in themselves they offer strong protection against many types of infection. Consequently, preventive immunization will also secure effective protection against bacteriologic attack.

If a bacteriologic attack is imminent and a state of emergency has been declared, it is critically important to have all doors and windows made airtight. At the same time, small household objects such as books, spare shoes, articles of clothing, and the like, should be covered up, in any way at all. A matter of major concern is to protect whatever food and water supplies happen to be on hand. All available containers (pails, small tanks, bathtubs, basins) should be reserved for some extra water to be used in washing and disinfecting the dwelling.

Some immediate protection against the effects of bacteriologic weapons can be secured by making expert use of both individual and group antichemical defense equipment. Every family must therefore have on hand some auxiliary means for protecting the respiratory organs, eyes and skin. In addition, everyone must be familiar with the civilian defense alarm signals, as well as the location of the nearest shelters.

In case of bacterial attack, the first matter to be attended to is partial or complete sanitation treatment and disinfection of the dwelling, furniture, and other objects, followed by decontamination of food-stuffs and water. Members of the family who happen to be outside the

shelter, without any means of protecting their respiratory organs, eyes and skin, should have some emergency prophylactic equipment issued to them, at the instruction of medical personnel.

It cannot be too strongly emphasized that the best possible protection still leaves some vulnerable areas to consider. The possibility of some diseases emerging in the wake of the bacterial attack cannot therefore be entirely ruled out. Any case of illness in the family must at once be reported to the nearest medical institution and the sick person must be isolated.

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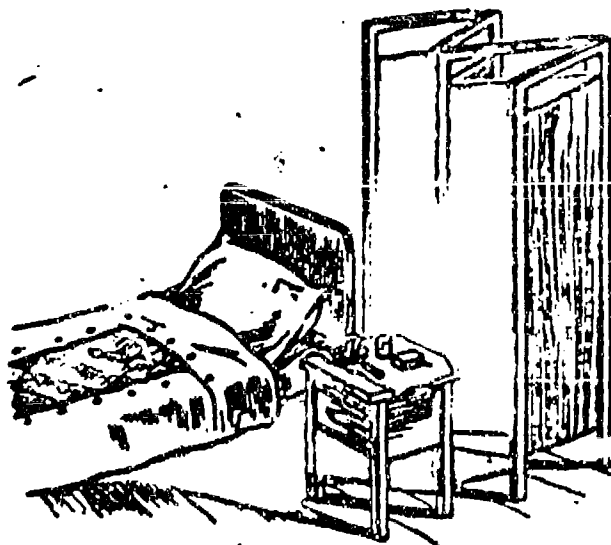


Fig. 15. Patient isolated by screen.

After the patient has been examined by a physician, he may be either hospitalized or left to be treated at home, depending on the type of infection and the actual setup. If treated at home, the patient must be isolated by being kept in a separate room, or in a screened off area, which can also be set off using a few besheets.

In all cases it is best to have just one person assigned to take care of the patient, who should have a few dishes and some nursing equipment set aside for his personal use.

Dishes, spittoons, Kelly rings, urinals, bedpans are decontaminated with disinfectants or by boiling. A small stock of disinfectants should be laid in, for future use. Underwear and bed linen can be similarly disinfected. The patient's excreta (sputum, feces, urine), as well as leftover food, must be disinfected before they are disposed of, through house facilities or in the outhouse.

The person tending the patient should observe all prophylactic rules (wear a smock, a cotton-gauze mask, wash hands with soap). Relatives and fellow tenants must not be allowed to visit the patient.

After the patient has recovered, or has been hospitalized, his underwear and bed linen, packed in a bag, are sent to a disinfection chamber, or are decontaminated by soaking and boiling in disinfectant. Dishes, nursing equipment, and other things handled by patient must likewise be disinfected.

PROTECTION OF INDUSTRIAL WORKERS AND OFFICE PERSONNEL FROM THE EFFECTS OF BACTERIOLOGIC ATTACK

Men at work in industrial plants, factories, establishments and institutions must be protected against bacterial weapons much in the same way as they are at home. The task calls for a combination of sanitizing and hygienic steps, immunization, emergency use of the various means devised for individual and group antichemical protection. A further requisite is timely elimination of the consequences of bacteriologic attack.

It is particularly dangerous to bring the infection to an industrial establishment or an institution, where a large working force is exposed to it, so that quite a few persons may simultaneously contract a contagious disease. It follows that antibacterial measures designed to protect a large working personnel have to be carried out with special care and to the fullest extent. True enough, the over-all conditions

existing in industrial plants and public institutions facilitate the carrying out of protective measures. A large organization can provide all the necessary facilities for setting up shelters, building up a stock of individual protective supplies for antichemical defense, carrying out sanitation and hygienic measures on a large enough scale, launching an immunization drive, arranging for emergency prophylactics, disinfection, partial or complete sanitizing treatment, etc.

Sanitation and hygiene are a matter of particular importance for industrial and institutional personnel. It is most essential to maintain adequate hygienic conditions in industrial premises and auxiliary space. In so far as possible, all areas should be rendered airtight.

Observing the rules of personal hygiene is no less important for the personnel at work as it is at home. The hands must be thoroughly washed after work and before taking a meal. It is a matter of special concern for the management that enough washbasins are provided and kept in good repair. The lavatories must have the proper equipment. Cabinets and other arrangements must be made available for storing disinfectants, brushes and soap.

Running (tap) water, water-coolers (fountains) or tanks with drinking water must be provided or installed in all places where men work or congregate (clubs, factory movies, sports halls, libraries, etc.). There will thus be no need to use water from casual sources.

First-aid medicine chests should be installed in the plants, holding supplies of antibiotics, chemotherapeutic preparations and other curative and prophylactic remedies. Such facilities should be provided on a scale commensurate with the number of men working in the various shops and service rooms, allowing for the specific and actual conditions existing in the plant.

In current repairs, as well as full-scale alterations and

overhauling of stockrooms, kitchens, dining halls, lunch counters, stores, etc., arrangements must be secured, according to plan, whereby foodstuffs, dishes, kitchen utensils, could be stored under conditions precluding the possibility of any bacterial agents settling on foodstuffs or prepared food. (Such facilities would include air-sealed counters, tightly locking closets, airtight vehicles for food transportation, autoclaves, kitchen pcts fitted out with special covers, etc.). In addition, unauthorized persons should be barred from all premises where food is prepared or food supplies stored. The health of persons employed in kitchens, dining rooms or provision storerooms should be closely watched and checked.

Immunization of factory, office, school or institutional personnel should be comprehensive, while carried out in the shortest possible time.

In eliminating the destructive effects of bacterial weapons, involving an organized group of workers, first consideration must be given to preventing the infection from spreading beyond the limits of the initial object. As soon as the fact of a bacterial attack has been confirmed, all traffic of men or goods, either incoming or outgoing, must be barred as the contaminated area is sealed off. The shipping and receiving of goods can be resumed only after the entire area has been decontaminated, including all buildings, structures and installations therein, and a number of other special protective steps have been carried out.

Until the species of bacterial agents used have been identified, it is advisable to restrict communication between men employed in different workshops.

When a contaminated object is removed from the area, all persons concerned must be subjected to emergency prophylaxis and complete

sanitation treatment, including disinfection of under and outer garments, shoes, and any individual protective articles and apparel.

Individuals who have contracted the infection must be sent to hospital for contagious diseases or placed in infirmaries set up on the grounds of the given establishment.

Evacuation of patients afflicted with particularly dangerous infections (the plague, smallpox, cholera) from the contaminated area is prohibited.

Within the bounds of the contaminated area, disinfection is carried out in the following order: first, the transportation facilities are decontaminated, then the external surfaces of the buildings and installations, and finally the interior premises.

Decontamination of foodstuffs is accomplished by various methods. Choice of procedure is determined by the characteristics of the product, the way in which the food is packaged, and also the particular species of microbe used in the attack.

An important factor in carrying out protective measures is the civilian defense. This is equally true whether an organized collective or an individual household is concerned. Broad assistance rendered by the population to CD is an essential requirement for the success of antibacterial protection.

IDENTIFICATION OF DESTRUCTIVE BACTERIAL AGENTS: GENERAL CONCEPT

The term "identification" is generally related to a combination of techniques developed for a two-fold purpose of establishing the fact that bacterial weapons have been used, and identifying the species of microbes, or the nature of toxins, involved.

Identification methods may be specific or nonspecific. The simplest and most rapid method of nonspecific identification is visual observation. This type of subjective, conjectural observation requires

thorough verification. An adjunct to visual observation is determination of the number and size of foreign biological particles suspended in air. In recent years various electronic systems designed for such determinations have been tested in several laboratories abroad. The operation of these devices is based on different chemical methods. By this time a number of devices, including the impactors, have been developed for rapid determination of the number and size of particles suspended in air.

Specific identification of bacterial agents includes the following basic steps: 1) sampling, followed by delivering the samples to a laboratory; 2) preparation of samples for testing; 3) growing the microorganisms and identifying their species.

Test samples are taken from the air, water, foodstuffs, matter collected from infected individuals and patients (washings from the nasopharynx, sputum, vomitus, blood, feces, urine, etc.).

Identification is an aid of exceptional importance in the system of antibacterial protection. Once the species of microbes or the nature of toxins has been identified, effective countermeasures can be taken in order to eliminate the consequences of attack.

The population can participate to some extent in the carrying out of identification procedures. The people can make a note of the particular spots where bacteria-carrying rockets have been delivered, or containers filled with insects have been dropped. They can further mark some areas infested with creeping or flying insects, as well as rodents. They can detect the thin films of deposited powders, or drops of oily liquids settling on grass, trees, walls of buildings, etc. The factory management, heads of establishments and institutions, the militia and medical officers should be notified without delay. This will help significantly in establishing the fact that a bacterial attack has actual-

ly occurred, and in taking timely measures of antibacterial defense.

THE CONDUCT OF THE POPULATION FOLLOWING CIVILIAN DEFENSE ALERT SIGNALS

An indispensable condition of effective protection against bacterial weapons or any other means of mass destruction is the efficient use by the entire population of individual and group means of antichemical protection, in response to the signal code established by the civilian defense. The population must be taught the meaning of each signal.

The Air-Raid Alert signal is a warning that the enemy is prepared to use some weapons of mass destruction, and that the danger is imminent. This signal is sounded by use of various sounding devices (sirens; factory or engine whistles; foghorns). Signals can also be transmitted over the radio and TV networks, as a broadcast announcement.

The experience of the Great Patriotic War shows that an Air-Raid Alert must be repeated in all establishments, offices and institutions, schools, dormitories, hotels, etc. Following the Alert signal, the population should remain calm and proceed in an organized manner to make use of available means of individual and group protection.

Let us assume that the Air-Raid Alert was sounded at a time when people were in their homes. In this case the children and elderly persons must be dressed without delay. The neighbors must be told about the alarm. The stored food and water supply must be packed to take along. All lights and electric appliances must be turned off, the furnaces must be put out, and the gas outlets shut. The entire family must go to be nearest shelter.

The Alert may also be sounded at a time when the majority of people are at work, in factories or offices, at school, or at public places (railway stations, theaters, stores, libraries, etc.). Under such circumstances, everyone will be directed to the nearest shelter by

management.

Passengers in street cars, trolley-buses, buses, or any other public conveyance, should undertake no action following the Alert until the vehicle is brought to a stop. When an Air-Raid Alert is sounded, it will be remembered, all surface transportation vehicles must halt; this will not require any action on the passengers' part. Before leaving the vehicle, passengers must put on some individual protective apparel and accessories (gas masks, goggles, overalls, raincoats). If they are not available, one must button up the coat or overcoat, lift the collar, cover up the mouth with a pocket handkerchief folded over a few times, or a triangle kerchief, and repair to a shelter as directed by the CD officer at his post.

The shelter must be entered in a quiet and orderly manner. Trying to get ahead of others cannot be tolerated. Order must also be maintained inside the shelter. Loud talk, singing, shouting, moving about (unless absolutely necessary), smoking, littering the place, is not permitted. If one feels indisposed, he should speak to the officer in charge, or the medical man on duty.

If areas contaminated with bacteria, poisons or radioactive substance have been discovered in a populated locality, a Chemical Attack signal lasting 1-2 min. is sounded by alternating long and short whistles. The Chemical Attack alert is transmitted simultaneously over the radio and TV networks as a broadcast announcement. The signal can also be sounded by drumming upon rails, ringing a bell, etc.

When the Chemical Attack signal is sounded, those already gone to shelters, which are equipped to provide antichemical protection, will remain there. Entering or leaving the shelter is not permitted. The people must stay in the shelter as long as necessary, depending on the circumstances.

People who happen to be at home, at work, in the streets, or any other place when the Chemical Alert is sounded, may avoid injury by running to cover (basement, cellar, large cranny) and making use of individual protective devices.

When the immediate danger of an air-raid is over, an All-Clear signal is sounded and transmitted over the radio and TV networks. This signal means that the population is now free to leave the shelters and cover places.

No All-Clear signal is transmitted to areas wherein a site of bacterial infection is located. The local population cannot leave the shelters until directed to do so by the officer on duty in charge of the shelter.

Persons leaving shelters and other places of cover located in a contaminated area are requested to put on gas masks, protective hose, gloves and cape. If no individual means of antichemical protection are at hand, some makeshift devices should be used to protect the respiratory organs, eyes and skin.

Because of the characteristic properties of bacterial weapons, special precautions should be taken when passing through the contaminated area. Persons wishing to leave must follow exit routes assigned for the purpose. On the way, one is not allowed to enter any dwelling or any other building. It is not permitted to lie down, or sit down, lean against the outside walls of buildings, pick up any objects found in the area, remove any protective apparel or accessories of individual protection, drink water, eat or smoke.

As one leaves the contaminated area, some bacteria may settle upon clothes, shoes or individual protective apparel. Hence, a partial, and the complete sanitation treatment should be applied following departure.

* * *

During the long years under the Soviet government, giant strides have been made in our country in the fight against infectious diseases. Within a chronologically brief period of time, dangerous afflictions such as smallpox, malaria, Dracunculus (guinea-worm disease), the plague, glanders, have been effectively stamped out. At the same time, the incidence of infection has been sharply reduced throughout the country. The present conditions in the USSR offer every opportunity for a still more successful drive against contagious diseases. From one year to another, the standard of life enjoyed by the Soviet people is steadily improving. A broad network of combined epidemiological stations and sanitation posts has been built, along with some research institutes. Our men of science keep supplying our health agencies and centers with new, ever more effective prophylactic remedies.

The progress achieved in fighting infectious diseases constitutes a major factor in effective protection of our people against bacterial weapons.

Every Soviet citizen must be familiar with means and ways of improving anti-bacterial protection so that our country's defense capabilities will be further strengthened.

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