

lecting stations of the medical battalion. It will require sufficient area for complete establishment, preferably in a village with buildings for shelter and with water, sewerage, and electric lights if available. Initially, these stations are concealed from enemy observation; however, after the action has been started, they may be located openly but at some distance from military units which might attract bombing. Then these stations should be plainly marked with large white crosses.

When the ambulance haul becomes excessive, these stations are displaced forward. Occasionally there may be two of these stations established by the one clearing company of the division—one behind the main effort in a wide envelopment, and one behind the secondary attack. Casualties are given temporary care and emergency treatment and prepared for evacuation to the rear as rapidly and safely as possible. In charts I and II will be noted a mobile surgical hospital (an Army unit) which has been sent up from Army to be established near the clearing station in order to take care of the very seriously wounded who cannot be moved without jeopardizing the lives of the patients, the so-called "non-transportable" cases. Once established, this unit does not move so rapidly as the clearing station of the division, because of the condition of the patients it handles. This unit may be equipped in large motor vans or trailers. Surgical teams with anesthetists, nurses, and surgical technicians are found in this unit.

VI. ARMY MEDICAL SERVICE.—This consists of an Army

Surgeon's Office, certain medical regiments, evacuation hospitals, surgical hospitals, one convalescent hospital, a laboratory, a medical supply depot and a veterinary company (see Chart II). These units furnish the evacuation and hospitalization system throughout the Army Service Area of the Combat zone by giving the necessary medical attendance to army troops, by reinforcing the medical service of the several army corps and divisions, and by evacuating casualties from all of the clearing stations of the army corps and divisions to the evacuation hospitals where they are hospitalized pending their recovery, removed to fixed General Hospitals on hospital trains of the communications zone, or sent to the zone of the interior (home).

It will be noted that the Army Corps is not normally a link in the chain of evacuation from division to army installations unless acting independently, in which case it takes over certain army functions, after being augmented by the higher echelon with ambulance companies, surgical and evacuation hospitals.

VII. GENERAL PRINCIPLES OF EVACUATION.—a. Efficient operation of the medical service is a function of command.

b. The medical service must be continuous, regardless of the location or employment of the troops.

c. Freedom of action of combatant troops must be maintained by the prompt evacuation of casualties.

d. Sick and Wounded must be evacuated only so far to the rear as may be necessary.

Chemical Warfare

By

CAPTAIN NELSON J. ANDERSON, *Chemical Warfare Service*

Regardless of treaties that exist between the belligerents of the world, no nation dares assume the attitude that preparation for chemical warfare can be neglected. The information we have concerning the amount of preparation by the Axis for chemical warfare urges us to promote our own efforts in this direction. Our enemies are well equipped with chemical agents and well prepared to use them; thus, it is perfectly possible that gas warfare may burst into full intensity at any moment. In this connection General Porter, Chief of Chemical Warfare Service, states:

"This war will never be really 'all out' until gases once more flood the battlefields."

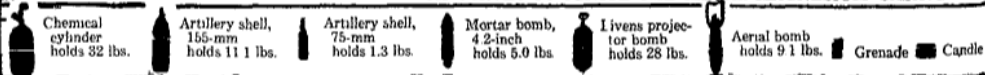
Thus far in the present European conflict, poison gas has not been used; but incendiaries and smoke have been extensively employed. In Africa, the Italians resorted to mustard gas in the Ethiopian Campaign. In China, the Japanese were reported to have used poison gas. Up to the present time, the Germans have not considered it advantageous to them to use poisonous agents. Until the time of their great reverses in Russia, the Germans had been engaged in aggressive advances which were often made rapidly in a lightning-war manner that did not offer the prospects of gaining great advantages by using poisonous agents. The Germans were accomplishing their missions without poison gas. In Russia, they expect to advance again, perhaps under

circumstances that will not be conducive to the use of poison gas. However, if Hitler sees an opportunity to make a gigantic, overwhelming stroke with gas, he can hardly be expected to hesitate.

In one particular field of chemical warfare, incendiaries, the Germans have already made extensive progress and wide application since the beginning of the present war. They have developed the so-called "electron bomb" which is probably the most efficient incendiary bomb that has ever been devised. It is cylindrically shaped, has a length of about fourteen inches, a diameter of two inches, weighs 2.2 pounds, and contains a few ounces of thermit. It has a thick-walled eighty percent magnesium shell which is light and combustible. Unlike the "thermite bombs" of the last war, thermit in the modern electron bomb serves only to ignite the magnesium shell. The thermit reaction within the shell is set off by an igniter on either the nose or the tail of the shell. Unlike other types, the electron bomb does not explode on impact; instead, the thermit reacts violently for about a minute at a temperature of approximately 4500 degrees F. Jets of flame are emitted from vents in the shell, and bits of molten and burning particles which are forced through these holes scatter in every direction for a distance of about fifty feet. This scattering ends when the thermit is consumed. However, by that time the magnesium shell has been ignited













CHEMICAL WAR

* CNS, A SOLUTION OF CN IN CHLOROFORM AND CHLORPICRIN, FREQUENTLY USED FOR SHELL FILLING
† THE FILLING OF A MAGNESIUM BOMB WHICH SERVES TO IGNITE THE METAL MAGNESIUM CASING

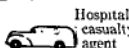


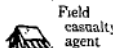
FARE AGENTS

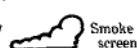
Prepared by Lt. Col. Walter P. Burn, C.W. Res.

PRO-TECTION	FIRST AID	COLOR & STATE LOADED	RELEASED	PERSIS- TENCE	TACTICAL USES	FIELD NEU- TRALIZATION
	Remove clothing. Wash affected parts of body with gasoline, soapy water. Do not bandage.	Heavy dark, oily liquid	Liquid slowly evaporates	Open 1 day Woods 1 week to all winter	To neutralize areas. Counterbattery. Attack on personnel.	Cover with bleaching powder & earth 3%. Sol'n of Na ₂ S
	Wash with oil, hot water, soap. CUT AWAY small area of flesh 5% solution of NaOH. Apply Ferric Hydrate paste.	Dark green, oily liquid	Slowly evaporates	Open 1 day Woods 1 week	Similar to Mustard.	Wash down with water. Cover with earth. Alcohol NaOH spray
	Wash with gasoline, hot water and soap	Clear oily liquid	Evaporates at medium rate	1 hour	Counterbattery. Preparation fire. Harassing fire.	Cover with earth, caustic, NaOH solution
	Wash eyes, keep quiet and warm. Do not use bandages	Yellow oily liquid	Colorless gas	Open 6 hours; Woods 12 hours	Harassing fire.	Na ₂ SO ₃ - Sodium Sulfite in alcohol solution
	Keep quiet and warm. Give coffee as a stimulant	Colorless liquid	Colorless gas	30 minutes	Harassing fire.	Alkali
	Keep quiet and warm. Give coffee as a stimulant	Colorless liquid	Colorless gas	10 to 30 minutes	Surprise attacks, projectiles. Gas cloud release. For quick physical effect.	Alkali
	Wash eyes with water or boric acid. Do not rub or bandage. Wash skin with 4% Na ₂ SO ₃ in 50% Alcohol Solution	Brown crystalline powder	Cloud of small, solid particles	10 minutes	Training. Mob control. CNS used in counterbattery to force mask wear.	Strong, hot solution of Sodium carbonate
	Wash eyes with boric acid. Do not bandage.	Dark brown oily liquid	Slowly evaporates	Several days (weeks in winter)	To neutralize areas. Counterbattery.	Alcoholic Sodium hydroxide spray
	Remove to pure air and keep warm and quiet	Yellow-green granular solid	Yellow smoke	10 minutes	Gas cloud attacks. Mob control.	Bleaching powder solution
NONE	Produces no effect requiring treatment	Grey solid	Grey smoke	While burning	To screen small operations in own lines and for training purposes.	None needed
	Wash with Soda solution	Clear liquid	Dense white smoke	5 to 10 minutes	Airplane spray for screen on broad front.	Alkaline solution
NONE	Produces no effect requiring treatment	Yellowish liquid	White smoke	10 minutes	Screening operations	None needed
	Remove to pure air; keep quiet. Sniff chlorine from bleaching powder bottle	White crystalline solid	Vapor or fine smoke	Summer 10 minutes	Harassing fire	Bleaching powder solution
NONE AVAILABLE	Wash with Copper Sulphate Solution or immerse in water	Pale yellow solid	Burns to white smoke in air	10 minutes	To screen advancing troops. Cause incendiary effects, losses. Harass enemy observers.	Burns out
COVER WITH EARTH, SAND	Treat for severe burn	Metallic powder	White-hot metal	5 minutes	Destruction of materiel.	Quickly cover with earth or sand
	Remove from gassed area. Keep quiet and warm. Coffee as stimulant	Yellow liquid	Yellow-green gas	10 minutes	Surprise attacks (cloud).	Alkaline solution

 Airplane spray

 Hospital casualty agent

 Field casualty agent

 Smoke screen

 Incendiary agent

 Gas mask

 Gas-proof clothing

and burns for ten to fifteen minutes at a temperature of nearly 2400 degrees F., setting fire to any combustible material within a radius of a few feet. From one to two thousand of these bombs can be carried in a bomber plane.

The 2.2 pound electron bombs are used only for indiscriminate bombing; whereas heavier bombs of similar construction, weighing from about four to fifty pounds, are used when specific targets such as factories, supply bases, and munition dumps are attacked.

Several methods of extinguishing or controlling the burning of electron bombs have been developed. Among the various methods is one that makes use of a "snuffer," a cup-shaped bucket large enough to cover the burning bomb completely, which shuts off the air and suppresses combustion. Another method is to shovel dry sand on the bomb. Usually, sand does not completely extinguish the bomb, but glare and heat are reduced until it is possible to move both the sand and the bomb into the open where it can burn itself out without any serious danger. Of particular interest is the method in which water is used to control burning bombs. If the burning bomb is suddenly flooded with water, there will be an evolution of hydrogen gas which is likely to explode violently. On the other hand, if a stream of water is directed—say at the rate of about one and three-fourths gallons per minute—to the seat of the fire and a surrounding spray wets the area near the bomb, the combustion can be controlled. Water accelerates the burning so that a 2.2 pound electron bomb will be completely consumed in three minutes or less, and the water also reduces the spread of fire. Special apparatus has been manufactured for the purpose of extinguishing the electron bomb by means of water, but it can be accomplished with an ordinary garden hose.

Protection against incendiary bombs is only one of many problems in chemical warfare defense. To be ready for any eventuality, the law of the land charges the Chemical Warfare Service with military problems relating to the fields of poison gases, screening smokes, and incendiaries. The functions of the Service, however, have been expanded beyond the bare outline of the law; today the Service is the adviser of both the War and Navy Departments on all matters pertaining to chemical warfare and many problems of chemical manufacture pertaining to national defense. To this end, the Chemical Warfare Service and the American Chemical Society are cooperating. The President of the American Chemical Society has appointed a group of some twenty distinguished members annually to assist the Chemical Warfare Service in carrying out its mission. This committee is known in common parlance as the Advisory Committee of the American Chemical Society. It meets from time to time to study the problems of the Chemical Warfare Service and to offer its suggestions generously. Much of the success that the Chemical Warfare Service has achieved in meeting the urgent problems of National Defense during the past two years is due to the American Chemical Society as an organization and to the individual members who have given so freely of their time and information.

These important assistants aid the Chemical Warfare Service by laying the foundation for its work, which is divided into (1) research, (2) development, (3) procurement, (4) manufacture and supply of chemical warfare equipment and materials, and (5) training in chemical defense

and in combat functions to include the offensive use of chemical weapons and agents. The last of these is unusual in that it is the only combat function with which an army service is charged; all other combat functions are responsibilities of the arms. On account of demands from these varied activities, the officer personnel includes not only men with chemical training, but also men who are well versed in all forms of military art.

In accomplishing the mission of the Chemical Warfare Service, the responsible personnel have attained important results. When the present emergency began, research and development was far enough advanced to start production as soon as funds were made available. One result has been that all personnel of our expanded Army were provided with training masks, for there were enough of them on hand in October 1941 to meet necessary requirements.

The research organizations at Edgewood Arsenal have been greatly supplemented recently by invaluable aid from the National Defense Research Committee. Through this organization the best chemical talent in the country has been made available. Dr. James B. Conant, renowned scientist and president of Harvard University, heads the organization. The Chemical Warfare Service has recently set up a development laboratory at the Massachusetts Institute of Technology. With the cooperation of that institution, the Chemical Warfare Service will be able to continue working on many problems which the facilities there make available.

Accomplishments made possible by cooperative efforts to formulate plans are due in no small degree to the military personnel assigned to specific tasks. This personnel has also rendered other valuable assistance. The Chemical Warfare Service, for instance, is conducting training classes for firemen and other civilian workers in the defense of cities against incendiary attacks.

Viewing the United States military forces in a broad perspective in order to see where chemical warfare troops are to function, some plans are found to be taking shape. According to FM 101-10, the field army is assigned the following chemical warfare units: three decontamination companies, one depot company, one laboratory, one impregnating company and one maintenance company. The decontamination companies are prepared to neutralize vesicants (substances that blister the skin) and other chemical agents. The depot company handles the rather difficult chemical warfare supply problems. The maintenance company repairs chemical warfare material in the combat zones and keeps equipment operating in the best condition possible. This work is so important that it may be necessary to assign more than one such company to a field army. The impregnating company treats contaminated clothing to make garments wearable and impregnates ordinary uniforms with chemicals which give the wearers increased protection against vesicants. The field laboratory, provided with portable chemical and physical equipment as well as with a technical library, operates in the advanced zone of the Theater of Operations. The personnel of this unit analyzes enemy chemical agents and munitions so that army commanders can be informed with the least possible delay as to what protective measures should be taken.

The chemical agents most likely to be used offensively by an enemy and against which our military personnel are being trained to defend themselves are those shown on the accompanying chart. The colors designate tactical classes of agents: green is for agents producing hospital casualties; red, for harassing agents; yellow, for screening smokes; and purple, for incendiaries. In three cases there is overlapping of the tactical classes: white phosphorus not only produces a screening smoke, but may also be a casualty agent and an incendiary; diphenylchlorarsine is both a screening smoke and a harassing agent; chlorpicrin may produce hospital casualties or function only as a harassing agent. Colored bands which correspond to the tactical class are painted on munitions and on the containers of chemical agents. One green band is used for containers of phosgene and chlorine because they are nonpersistent agents; however as the others of the casualty producing class are persistent, they are marked with two bands. A chemical agent is classed as persistent if it remains in the air where released in effective concentration for more than ten minutes; if no longer than ten minutes, nonpersistent.

In other respects it appears that the chart is self explanatory.

Whether all these chemical agents and other new ones will be used in the present world conflict will probably depend on whether the Axis groups take the initiative. If they do, the United States proposes to be ready. Furthermore, it will be necessary to take the offensive in order to win the war. If Hitlerism is to be defeated we must do more than follow its pace making, we must plan to win by some greater application of technical means than is possible by the enemy, and our research continues with this prospect in mind. New factories are being constructed which will increase our production of chemical agents. Two new chemical warfare arsenals are being built. Cooperation with the artillery and the air corps to work out methods of disseminating chemical agents in offensive war is under way. The Chemical Warfare Service provides technical personnel trained so that they may discover or develop improvements useful in all branches of the Military Service. This is a total war in which scientific discoveries and applications are fundamentally essential.

The Organization of Supply in the Army Rear

BY

MAJOR GENERAL A. KARYAKIN, *Russian Army.*

All Army transport, truck and animal drawn, is assembled and located within 3 or 4 kilometers of the railroad in the Army base. It delivers supplies to division distributing points for distances of 60 kilometers or more. Such distances are covered in one stage by trucks and in two by animal transport. When roads are bad, in wet weather, reliance is placed on animal transport. In the case of the right group, 100 trucks and 800 four-wheeled, animal drawn carts were used to haul a daily tonnage of 250 metric tons. One-half of the carts were based at the railhead and the other half about midway between the railhead and distributing point. Thirty trucks and 200 carts were used to supply the left flank. The daily load for this group was 500 metric tons.

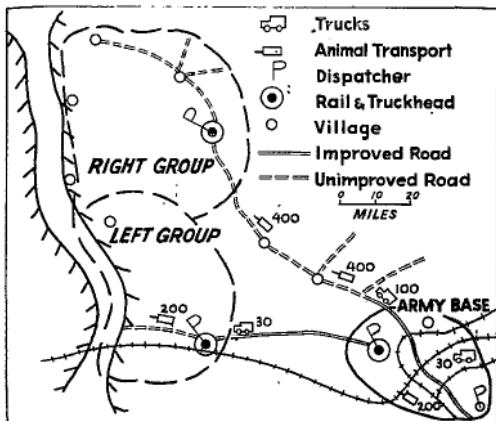
The left group also used a railhead for a distributing point for some of its supplies. This group required daily: ammunition—100 metric tons, rations—250 tons, gasoline—150 tons. The right group required daily: ammunition—50 tons, ration—100 tons, gasoline—100 tons.

Thirty trucks and 200 carts were kept in reserve near the Army railhead, for emergencies.

At the railhead, distributing points and motor park for the reserves, are dispatchers' posts consisting of 2 to 3 men. All requisitions are sent to the dispatchers. These may come either directly from the unit making the requisition or from Army Headquarters.

Whenever a dispatcher receives a requisition he calls for the necessary transport and gives the train commander an order slip which contains the following information:

- (1) The route
- (2) The load
- (3) The time loading schedule



- (4) The time en route and unloading
- (5) The place to report near the front after unloading
- (6) The cargo to bring back on the return trip
- (7) The time of arrival at the railhead.

Supply transportation is used for various purposes on the return trip. Namely, to bring back wounded, return empty ammunition boxes and miscellaneous cargo.

This method of supply has been in use for four months and was successful even where the roads were very bad.

From *Krasnaya Zvezda*