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CHEMICAL WARFARE BULLETIN

A review of developments in the
application of chemicals
to military effort.

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REPRODUCTION PLANT
CHEMICAL WARFARE SCHOOL
EDGEWOOD ARSENAL, MARYLAND

Maj. Gen. William N. Porter
Chief of the Chemical Warfare Service

OUR JOB IN 1942

We are standing on the threshold of a New Year, a year that will apparently be, by all odds, the most important year in the life of the Chemical Warfare Service. We are engaged in a great war and expected to do those things for which the Service was designed and to do them efficiently and well.

Our responsibilities have increased by leaps and bounds. Held to a ridiculously small number of officers during the peacetime years, and funds insufficient even to maintain proper pilot facilities, we are now called upon to produce results on the widest scale.

We shall; but to do it each of us must put his whole heart and soul into it.

The expansion of facilities at Edgewood Arsenal is nearly complete and actual production is proceeding at full speed. During the present year our two new big arsenals at Huntsville and Pine Bluff will add their productive capacities to that of Edgewood. Some fifteen Chemical Warfare plants throughout the country will begin to add their flow of vital supplies.

We are faced with further increases, more plants, and probably more arsenals. The demands on us are greater every day and ample funds are at our disposal. We can only increase our trained personnel slowly. Those of you now in the Service must carry the expanding load for months to come. I know that you will do it.

In my mail today was a set of New Year's resolutions from a man I like in Canada. Across the bottom was a sentence I pass on to you to keep in your minds. This is it:

"NO BRAVE MAN SHALL DIE BECAUSE I FALTERED."

WILLIAM N. PORTER
Major General
Chief of Chemical Warfare Service

A Symposium - - -

CHEMICAL WARFARE GOES ON MANEUVERS

Reports from Chemical Officers of the Four Armies Give a Story of the Part the Chemical Warfare Service Played in the 1941 Maneuvers.

PROLOGUE:---The maneuvers of 1941 will go down in Army history if for nothing more than the precedence of "firsts" they established. Principal among these were: (1) first time maneuvers were held over such a wide area; (2) largest concentration of American troops ever held in this country, either in peace time or war time; (3) first time the entire standing Army participated; (4) first time an Armored Force unit as such took part; (5) first time air and ground forces cooperated as a single unit; (6) first time Naval Air Forces cooperated with Army Air Forces; (7) first "free" maneuvers with troops moving on their own, with no control whatsoever from higher command and with umpires functioning simply to make decisions; (8) first time troops were prisoners of war, captured, and exchanged as in the field of battle; and (9) first time press correspondents wore uniforms, were captured, and had to use their own ingenuity instead of handouts to get their news. All of this added up to a state of realism in the truest sense of the word, intended to give troops, as nearly as possible, actual war experience short of loss of life from shell fire. The part the Chemical Warfare Service played was perforce limited by the fundamental purpose of the maneuvers. G. H. Q. directed that the maneuvers should simulate an attack against a first class power, one which would be in a position to retaliate should gas be used against it. Therefore, an all-out use of gas was not simulated in these maneuvers. Nevertheless, the problem of gas warfare was not overlooked. All troops had to carry their masks,and wear them in areas designated as under gas attack. However, the tactical functions of the Chemical Warfare Service were mostly used in troop movements, with smoke screening playing an important part. With the thought that the Chemical Warfare Service learned many new things in the maneuvers, we have asked the Chemical Officers of the four Armies, which saw action in maneuvers, to participate in this symposium so that readers of the "Chemical Warfare Bulletin" may know all the pros and cons, and the possible value they may have in actual warfare.

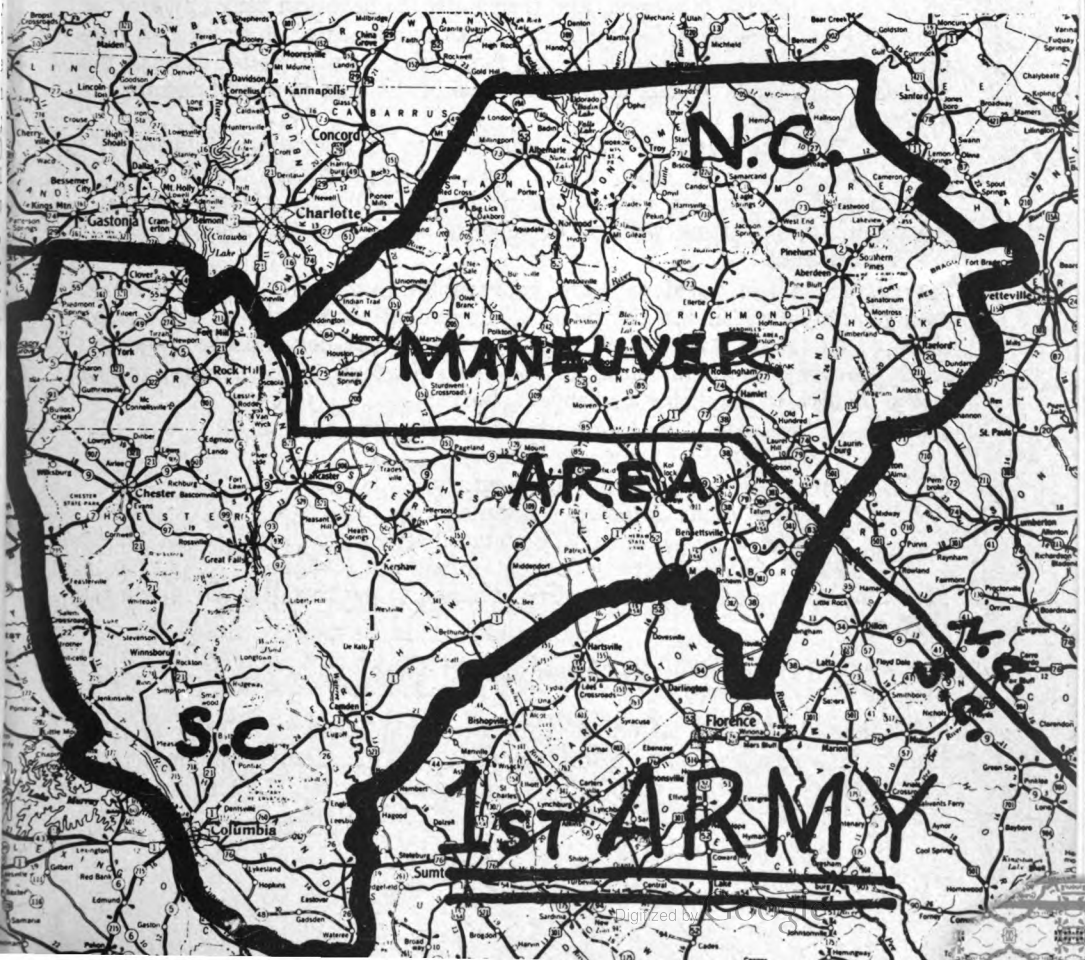
- The Editor.

WITH THE 1st ARMY

by
Colonel Haig Shekerjian,
Chemical Officer.

A

The First Army Maneuvers in the Carolinas during October and November, 1941, were the outstanding event of a year of strenuous training. Active operations were conducted under all kinds of weather conditions. Rapid movement and relentless day and night attacks were the rule. Sound leadership, and fine tactical judgement with units organized and equipped for the purpose successfully met the tank menace of the Armored Corps. The many favorable and commendatory comments from observers testified to the efficiency of the Army and the success of the maneuvers.



From a Chemical Warfare point of view, these maneuvers were featured and made more realistic by the fact that every individual in the First Army was equipped with, and carried a gas mask at all times. The Commanding General of the First Army, Lt. Gen. Hugh A. Drum, set the example in carrying this item of basic defensive equipment. The use of tear gas and simulated gas was restricted to the month of October. Only screening smoke was used during the November exercises.

It is believed that the proper use of screening smoke received a distinct impetus during this period. Frequent use of smoke screens was made to facilitate river crossings, withdrawals, and aid in many other situations. Many commanders have been reluctant in the past to use smoke in attack because it might slow up their movements and otherwise be of disadvantage to them. Cognizance was not taken of the fact that screening smoke placed on the target provides an effective means for infantry to cross open ground otherwise covered by withering aimed rifle or machine gun fire and that the proper use of smoke frequently provides a means of more readily attaining an objective without excessive casualties.

Smoke Effective Against Tanks

Anti-tank units have been quick to adopt smoke as a means to slow up, to cause loss of direction, and frequently, to paralyze tank movements temporarily. Whenever desired, the smoke can be lifted to provide a better target of approaching tanks, since they would be silhouetted against the smoke background. In this connection, one of the anti-tank unit commanders said:--

> "The use of smoke was a great help to my company in fighting tanks. Smoke not only slowed down the approaching tanks, but allowed my men to change the positions of their anti-tank guns from time to time without the enemy being able to observe the movement."

All arms and services were represented in the total of over 300,000 men participating in the maneuvers. Organization, armament and equipment of the Field Army were based on the latest developments adopted from the present world conflict. Chemical Warfare Service Units, adding a new feature to our army maneuvers, were:--

2d Separate Chemical Battalion (Less Cos. B, C, & D)
412th Chemical Company (Depot)
1st Chemical Company (Laboratory)
10th Chemical Company (Maintenance)
1st Chemical Company (Decontamination) (Colored)
2d Chemical Company (Decontamination) (Colored)

All of the numbered companies were attached to the battalion for administration.

Base Camp Established

A base camp for chemical units was established on a pine studded slope of the southern bank of Pine Lake, N.C. This picturesque camp site was used by chemical troops between maneuver phases. Laying out of the camp and streets, clearing of underbrush, and installation of ample shower

facilities was accomplished by chemical warfare personnel. Two swimming beaches afforded real pleasure during October, but only a few hardy souls braved the icy chill of the November plunge.

For field operations, installations were grouped in a Chemical Service Area established at Marston, about four miles to the east of the base camp. The battalion commander, Lt. Col. E. F. Bullene, commanded this service area while administration and supply were accomplished by his staff and the Battalion Headquarters and Headquarters Company.

The depot company was responsible for the storage and issue of all chemical supplies and equipment. Its principal issues were smoke pots, gas masks, gas mask repair parts and carriers. Stock piles were spaced with standard safety intervals, and in addition to actual stocks, included outlined piles of normal stocks that would be carried during actual warfare. A branch depot was also operated at Chester, S.C., to serve troops operating in that area.

The maintenance company efficiently operated its various shops. It has a group of trained mechanics and operators who are skilled in the art of repairing chemical protective equipment and weapons. Ingenious mechanical contrivances were frequently devised. The unit repaired all masks and carriers turned in by the field forces and reissued for use.

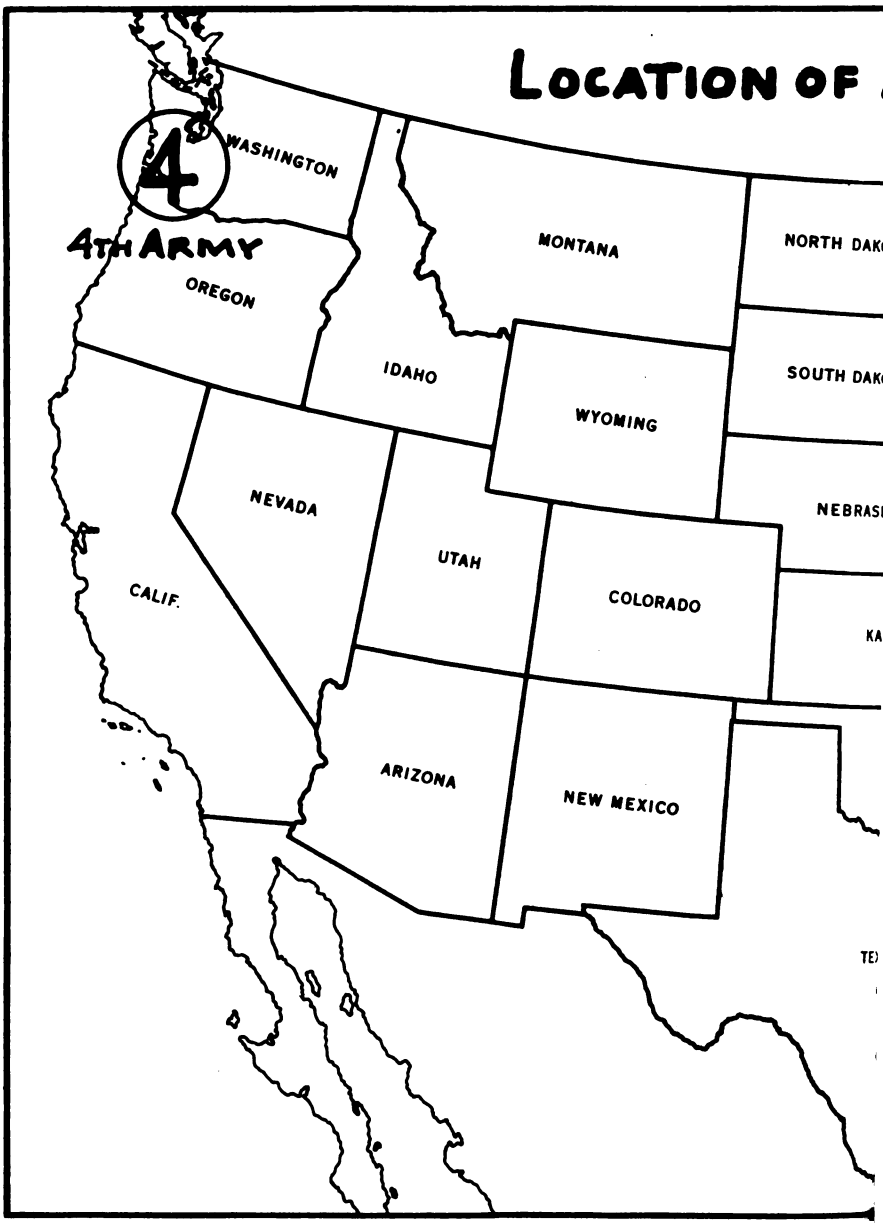
The field laboratory company was organized to conduct chemical and physical tests and a limited amount of research work. During the maneuvers a number of shell and other containers filled with compounds unknown to the laboratory personnel and assumed to be chemicals used by the enemy, were analyzed. Earth contaminated with various agents represented samples from areas where enemy gas shell or bombs had fallen.

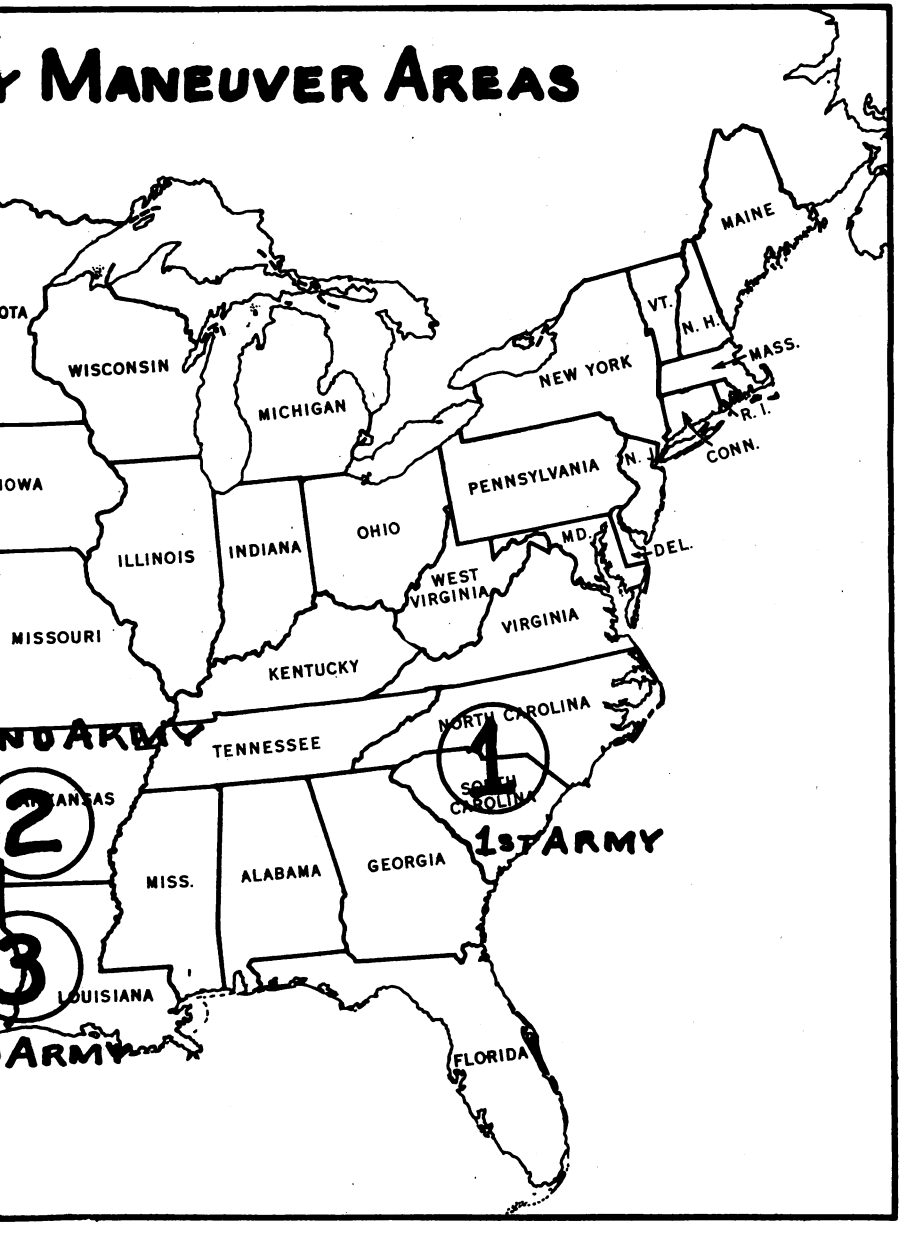
A preliminary report by telephone and a final written report were made to the Army Chemical Officer. This preliminary report included vital information, such as probable effects of the agent and whether or not our gas masks and equipment would give adequate protection against it.

Crank Case Oil Fakes Mustard Gas

Both decontamination companies performed their duties of decontaminating simulated gassed areas with efficiency and in a skilled and scientific manner. Simulated gassed areas were usually outlined by Division and Corps Chemical Officers, and excavations made to simulate shell craters. The area was spattered with old crank case motor oil to make the situation more realistic. Upon request to the Army Chemical Officer, trucks loaded with necessary personnel and equipment were dispatched to neutralize the contaminated area. In addition, these troops performed much needed general labor duties within the area. They were also given some basic infantry training and in order to test security measures, made attacks against various service installations.

Many officers visited the Chemical Service Area; all were surprised at the many activities concentrated therein. Many commendatory remarks were made on the general layout, the camouflage, and the skill and efficiency with which our laboratories and shops were being operated throughout the maneuver period. The measures taken for the protection of the Chemical Service Area were declared by many neutral observers to be outstanding in thoroughness.





The First Army Maneuvers in the Carolina Area brought together for the first time experimental test units called Tank-Attackers. These groups were composed of several combat teams and a support echelon team whose primary mission was to assist, by special operations, the offensive employment of the combat teams.

As part of the troops to accomplish these special operations, the need of chemical combat troops was realized and Co. A, 2d Sep. Chemical Battalion, was detached for that purpose. It was attached to the First Army Provisional Brigade, which was composed of Army Detachments No's. 1, 2, 3, and 4, which in the Army and GHQ Phase, became known as Tank-Attacker No. 1, and 2, together with Anti-Airborne No. 1, which were known alphabetically as TA-1, TA-2, and AB-1. During the Army and GHQ Phase, the company less one platoon was attached to TA-1, and one platoon to TA-2. These units were under the personal control and direct supervision of the Commanding General, First Army. They were assigned the primary mission of being capable of immediate movement and employment offensively to destroy hostile mechanized and armored units as designated by Army Headquarters.

Combat Troops "Fog" The Enemy

The combat mission of the chemical troops in each of the tank attacker groups included delivery of appropriate chemical mortar fire, particularly screening smoke for concealing changes of gun positions and smoke barrier screens put down in sufficient depth at the extreme range of anti-tank weapons to slow down or disrupt any concerted tank action.

Each tank attacker group was organized into four combat teams consisting of artillery, anti-tank units and infantry, and a support echelon team composed of all special units. Each chemical platoon was a part of this support echelon team which included units of Engineers, Anti-Aircraft Artillery, Tanks, and a Cavalry Reconnaissance Troop (Scout Cars).

It was immediately decided that the proper and effective tactical use of the chemical platoon in the support echelon of the Tank-Attacker group must conform to the rapid mobility and offensive aggressive action of the entire group. To this end, instruction in rapid departure from an alert bivouac to attack positions; simulation of smoke screens by mortar fire; small detachments firing smoke pots, electrically; discharging of cylinders with FM Smoke, and other artificial means of designating mortar fire were practiced in a vigorous manner. Rapid reconnaissance, selection, and occupation of position were stressed in all preliminary training with the combat teams even to the point that reconnaissance and occupation would be practically simultaneous most of the time.

Success in operations against armored vehicles of the TA Groups was demonstrated conclusively in the Carolina Maneuvers. Much praise by the Army Commander was heaped on Tank-Attacker Groups of which Company A, 2d Separate Chemical Battalion, received its share.

It was universally recognized and demonstrated on several occasions that chemical combat troops armed with mortars can greatly assist the offensive operations of the combat team. One such demonstration was the successful operation of TA-1 in the GHQ Phase on November 18, in the vicinity of Richfield, N.C., against medium tanks.

Smoke Screens Show Offensive Value

Against these tanks, part of the total success was due to an effective smoke screen in front of these medium tanks, whose mass impetus was so slowed down that three batteries of 75 MM guns were able to destroy them as they emerged from the smoke. This operation together with others of similar nature has prompted many commanders to emphasize the necessity of chemical combat troops with each Tank-Attacker Group.

While there were numerous calls and opportunities for use of Company "A" with each of the Army Corps participating, the invitation to be a part of this newly organized and widely discussed Tank-Attacker Group was an outstanding distinction for Chemical Combat Troops.

No story of the Chemical Warfare Service activities in the Carolina Maneuvers would be complete without mention of our soldiers. Their discipline, general attitude and cheerful endurance of long hours of hard work demonstrated the fine spirit and high morale of our Army. They are real AMERICANS and splendid SOLDIERS.

WITH THE 2nd ARMY

by
Colonel Adelno Gibson,
Chemical Officer.

In the Second Army maneuvers in Arkansas and Louisiana, Chemical Warfare units took full advantage of the opportunity to place previous theoretical instruction to the test. Many of these efforts were successful and included a number of daring exploits, such as the hour and a half delay of an entire motorized regiment by only eight riflemen with the aid of smoke; the crossing, in the face of the enemy, of difficult streams by large forces with the aid of chemical troops; and the clever escape of a command car containing members of a division chemical team while at gunpoint of their captors.

The Maneuvers were divided into three periods, namely: (1) the corps phases, August 11 - 28; (2) the army phases, August 29 - September 14; and (3) the GHQ phase, September 15 - 30.

At the outset, one of the most gratifying advantages from the standpoint of the Chemical Warfare Service was the issuance of directives which carried real weight.

In regard to smoke, for example, the training directive issued by the Field Headquarters, Second Army, ordered each division, insofar as the tactical situation permitted, to use smoke pots as a means of generating smoke or to simulate the firing of smoke shell, specifying that the situation had to be one in which smoke as a weapon was a logical integral part of a sound tactical situation.

Harassing Gas Attacks Used

The use of Chemical Warfare tactics were more liberally authorized in the army and corps phases of the Second Army maneuvers. Directives from high command authorized the use of similar harassing gas by an enemy to force wearing of the gas mask, and, thus, slow down operations at important headquarters. Specific periods were designated by the corp commander, first in the corps phase and again in the army phase during which each major headquarters down to and including a brigade was declared to be under a harassing gas attack of tear gas for one-half hour. These periods were selected at active periods for the headquarters involved in order to constitute a real test. All officers and men now wearing masks during these periods were tagged by the umpire as simulated gas casualties and were evacuated. When the maneuver was two-sided, harassing gas attacks were directed against a known located enemy headquarters by means of a Chemical Warfare detachment with neutral markings. In order to justify the action of the neutral marked detachments, the headquarters was taken under artillery gas shell fire in a tactically sound manner.

The directive, containing instruction for using chemical warfare means and methods, also specified that when an enemy mustardizes an area, troops were to continue to operate under the conditions of paragraph 55 d. (1) and (2), FM 21-40, which states that "The length of time that men

wearing ordinary clothing can remain in an area, contaminated with a vesicant, before becoming a casualty will probably not be more than a few hours."

"Mustardized" Areas Designated

The corps commanders were instructed that at least once during the corps phase of the maneuvers, and again during the army phase, to designate by orders and by marking on a map and notifying all concerned, that there was a mustardized area in each division zone of action of sufficient extent and at such a time as to cause the division commander to modify his plan of maneuver or to take certain precautions in accordance with the principles of Field Service Regulations.

Areas mustardized during the maneuvers were marked on the ground by the Division Chemical Officer. Special mustard gas signs were prepared for use in the Second Army maneuvers. One of these was a small yellow card 5" x 8" with the words mustard gas printed in large letters and in red ink. Also printed on the card in black typewritten letters were excerpts from field manuals and field service regulations pertaining to Chemical Warfare regulations. A larger version of a mustard gas sign 10" x 15" in size, and also printed on yellow cardboard contained a map of the maneuvers on the back. Printed on the front of this card were the words "Mustard Gas" in large black letters and in addition all the important excerpts from field manuals and field service regulations pertaining to Chemical Warfare procedure.

TAKE MEASURES TO MEET A SIMILAR ACTUAL BATTLEFIELD SITUATION. COMPLY WITH FIELD SERVICE REGULATIONS AND BASIC FIELD MANUAL. (SEE QUOTATIONS HEREWITH)

FM 21-40: 55d (1) The length of time that men wearing ordinary clothing can remain in an area contaminated with a vesicant before becoming casualties will probably not be more than a few hours. Knowing this to be the case, such troops are unlikely to be of much value.

MUSTARD GAS

UMPIRE AUTHORIZING POSTING:_____ HOUR:_____

OFFICER POSTING AREA:_____ DATE:_____

FM 21-40: 55d (2) When it is deemed imperative to utilize the position, as few men as are absolutely essential should be left in the area. They should be provided with all possible means of protection and they should be relieved after 2 hours, or sooner if practicable. It will sometimes be feasible to withdraw initially all men from the area, sending a small number back into it only when fire from this position is required.

(CW OFFICER, Second Army, August 11-41.)

Thus, these cards served not only to designate a gassed area, but also gave immediate reference to officers involved as to the procedure they were expected to follow in a simulated or actual gas attack. At the same time, the card, containing a map on the back, proved to be exceedingly popular, and no doubt helped to spread the "propaganda" of the Chemical Warfare Service. Funds were provided to print 5,000 of these cards.

Simulated Gas Casualties Authorized

As in the case of tear gas attacks during the maneuvers, umpires were authorized to take simulated gas casualties in the mustard gas areas and direct evacuation by the Medical Corps of all officers and men, not wearing their masks throughout the period, coming in close contact with mustardized ground, or with high vegetation from which their clothes or bodies could be contaminated, and those remaining in a contaminated area the length of time designated by paragraph 55 (d), FM 21-40.

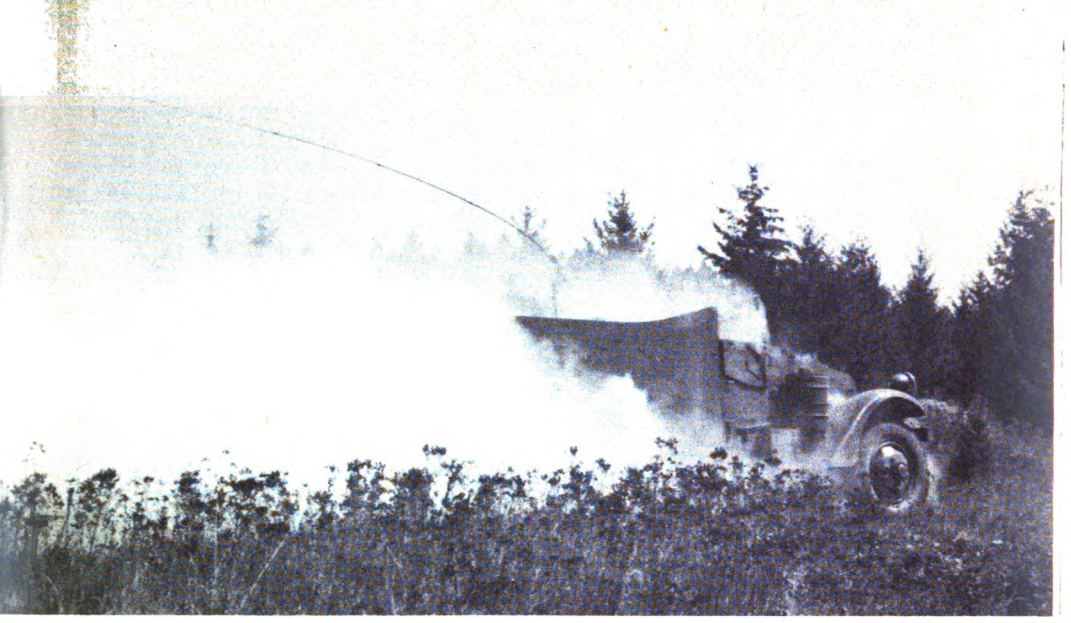
The Second Army allotted to the Army Chemical Warfare Officer a sum of $30,000.00 for the purchase of chemical munitions. However, it became impossible to purchase the full amount of smoke pots authorized, and the full amount of the allotted money was not used. Even so, the variety of chemical munitions made available through the cooperation of the Office of the Chief, Chemical Warfare Service, was probably greater than ever before used on a large scale maneuver.

Simulated mustard gas of the molasses residuum type proved valuable and was cheap, simple, and practical. However, the job of getting the stain out of clothes proved to be a problem. CNB solution, when rendered non-inflammable by proper proportion of carbon tetrachloride, had a distinct training value, although improved methods of dispersing it other than using the decontaminating apparatus may prove of greater value in other instances.

A scheme was devised by the Army Chemical Officer by which HC smoke pots could be simply and readily converted into anti-tank mines. A simulated anti-tank mine, approved by the War Department, consisted of a bottle of FM smoke mixture and a bottle of water between two pieces of wood fastened together by metal straps or wood lath. Pressure of a tank tread, fractured the bottles, and the mixture of water and FM produced a smoke signal, indicating to the umpire that the tank had struck a mine.

"Packaged" Anti-Tank Mines Prove Practicable

A modification of this practice simulated anti-tank mine was devised especially for the Second Army maneuvers (See p. 157, CHEMICAL WARFARE BULLETIN, October 1941). A bottle of FM was placed in a standard waxed paper container, and sharp-edged stones placed on top of the bottle. The remaining space was filled with water, and the lid replaced. These mines were planted in the ground with the top projecting at least two inches above the surface, with the bottom resting on a stone gravel foundation to insure that the weight of a heavy vehicle passing over it would break the FM container. These makeshift smoke mines saved time, material and expense, and, at the same time, produced a much larger smoke cloud.



Scout car escapes surprise attack by laying smoke screen set off from within the vehicle.

The container is almost identical in size, shape, and weight with the standard anti-tank mine now used.

There were several incidents in the maneuvers which helped to confirm the importance of the Chemical Warfare Service in tactical operations. A command car containing members of a division chemical team was surrounded by a platoon of enemy infantry. A lighted cigarette was slyly placed against the exposed match head on a smoke pot standing in the rear of the command car. The confusion resulting from the smoke permitted escape of the vehicle and its passengers, and the burning smoke pot held from the side of the command car provided cover for almost a mile down the road.

Another use of smoke pots from scout cars was used in the Second Cavalry Division, and consisted of a method of attaching smoke pots on the rear end of a scout car and wiring the pots in such a manner that they could be ignited from inside the car. Thus, the scout car established a smoke screen, and maintained it for several minutes while traveling across open terrain at about 20 miles an hour. A squib was placed in the starting mixture of each of six smoke pots, and the wires from the squibs were led into the scout car where a gunner could set them off by means of two flashlight batteries taped together. After several test runs, plans were made to use this method of laying a small protective screen to cover cavalry movements during maneuvers. However, because of umpire restrictions, no use was made of the system.

CWS Aids River Crossings

On three occasions, the Chemical Warfare Section of the 27th Infantry

Division assisted in river crossings, providing protective smoke screens after the operation was discovered by the "enemy". It became standard procedure for a detachment from the Chemical Warfare Section to accompany the first wave of assault boats. On one occasion the detachment crossed the river in advance of the action under a neutral flag, and placed smoke pots to represent mortar smoke shell.

It is believed that an entirely new method of the use of smoke was employed on the initial phase of the Red River in Grand Ecore, La. Reconnaissance was not permitted until 5:01 AM, at which time the operations commenced. The problem called for the screening of the highway bridge on Route 6 across the river. Weather reports showed a prevailing wind from East to West across the Red River. This would have been perfect for the operation. However, in view of the fact that winds often change, arrangements were made the previous evening to borrow a fisherman's boat.

At daybreak the following morning, it was discovered that the wind had changed and was now blowing directly up the river. The Division Chemical Team assigned to this problem rowed to the middle of the stream, and at 5:01 AM, released smoke from burning smoke pots in the rear of the boat, and the screen so generated covered the highway bridge in a highly satisfactory manner. In this connection, it was discovered that smoke pots, when burned out about one-third, could be set in the water to float and continue to give off smoke until exhausted. There is no loss of efficiency as is found when a smoke pot, after being ignited, is dumped over on its side in the water. It is interesting to note that in the Twenty-Seventh Division no withdrawal was attempted without the employment of smoke, either by Regimental Units, the Division Detachment, or a combination of both. Smoke was also employed very effectively against armored forces, usually turning their movements into confusion.

Considerable experience was obtained in contaminating bridges and road blocks prepared for demolition. Simulated mustard was used for this purpose, contaminated areas being designated by printed mustard gas signs.

Division Command Posts, both forward and rear, were exposed to an unannounced tear gas concentration. The reaction was excellent, and it also insured that all personnel exercised considerable care in carrying gas masks for the remainder of the maneuvers.

A raid made on enemy corps headquarters using smoke pots was successful. The enemy headquarters was completely disorganized.

On two occasions, enemy strong points were outlined with smoke pots to guide dive bombers to their targets.

Selecting Location of Chemical Dump

During the first part of the maneuvers, the 35th Division left its chemical dump and its supply personnel with the rear echelon of the Division Headquarters. This was not satisfactory, because they were usually located too far to the rear and off the main supply road, and control of this part of the section was largely lost from the Division Chemical Officer. Later a truck, cargo, 6 x 6, 2-1/2-tons, LW, and a trailer, cargo, 2-wheel, one-ton, was assigned for this use. The chemical dump was then main-

tained in the vicinity of the Division Ammunition Office. This procedure worked quite satisfactorily since it was easier to locate, it was always on a supply route, telephone communication was possible without laying an extra line by using the DAO line, the personnel was close enough to the Division CP to be messed there, yet far enough that camouflage was permitted, and closer control was possible by the Division Chemical Officer.

The operations group of a chemical section was combined with the ordnance section in a 2-1/2-ton truck equipped as an office. During the first part of the maneuvers the two sections had only one reconnaissance car available. Later a half-ton pick-up truck and a weapons carrier were made available, making possible more extensive reconnaissance and operations.

This arrangement was considered inadvisable for future use for several reasons. In this case the members of the two sections were unusually congenial but under much stress or with different personnel, friction could easily develop. A cheaper office could be arranged, such as a 1000 pound 2-wheel van, or an "igloo" to be carried on one of the one-ton trailers.

Regarding communications, prompt receipt of reports from regimental gas officers was stressed during the maneuvers. Except for telephone messages received during stabilized situations, messages and reports were received from three hours to several days after the time dated. When vesicants were used, information reaching the Division Chemical Officer usually arrived after such a lapse of time that it was of little value. Each infantry Regimental Gas Officer should have had available a reconnaissance car equipped with radio.

GHQ Phase Prohibits Use of Chemicals

Throughout the maneuvers, the 33d Division was on the defense, and during most of the phases, was withdrawing with little or no enemy contact; thus, limiting tactical use of smoke and chemicals in that unit. No opportunities could be found where CN grenades could be used tactically during the Corps and Army phases. While arrangements had been made for using chemicals, the practical difficulty of placing them tactically in enemy territory and the lack of provisions in the Umpire Manual for their use largely nullified these arrangements. Use of all chemicals except smoke was prohibited during the GHQ phase.

There was clear evidence that distinct progress was made during the maneuvers in arousing interest in the use of chemical warfare means and methods under battlefield conditions. As a result, a greater portion of the command, staff, and rank and file of the Second Army are undoubtedly more cognizant of how chemicals might be used against them, and what counter-measures to take, than was the case before the maneuvers began. This knowledge will make it much easier to carry on effective Chemical Warfare training at the home stations of the troops.

At the same time, the Chemical Warfare Service has learned lessons from the maneuvers that will enable us to establish more effective Chemical Warfare training in the future. An outstanding lesson is the importance and necessity of selecting as Corps and Division Chemical Warfare Officers, personnel especially fitted for duty in the field with troops. The

job requires officers who can make bricks without straw, who have imagination, initiative, energy and tact, and who under no circumstances will give up, however discouraging the outlook is. No job in the whole U. S. Army makes such rigorous demands on an officer's qualities of mind, heart, and body, as that of Corps or Division Chemical Warfare Officer.

WITH THE 3rd ARMY

by
Lt. Col. Francis H. Phipps,
Acting Chemical Officer.

During 1941 important components of the Third Army, commanded by Lt. Gen. Walter Krueger, have participated in several maneuvers in widely separated localities.

It was however, in the Beauregard area of Louisiana that the Third Army functioned as an entity. It was on the great maneuvers there, August 17-September 30, 1941, involving in their finale, approximately 473,000 men, that attention was focused throughout the nation. The movement into, the maintenance within, the evacuation of the area, the tactical handling of huge masses - but recently organized - were without precedent in peacetime operations of our military establishment.

In all, except GHQ directed operations, gas masks were habitually worn. But neglecting a use of 95 land mines (Simulated HS, 1 gallon) in contaminating demolitions, smoke (HC) was the only chemical munition expended and, of 3800 smoke pots issued to field units by the Third Army, 1210 were returned at the conclusion of the maneuvers to the San Antonio General Depot. The use of CNB had been considered but the fear of damage to civilian health and property had caused it to be put aside.

General McNair Clarifies The Situation

By GHQ action September 12, 1941, the use of chemical munitions in subsequent play was confined to smoke, and the wearing of gas masks was ruled unnecessary by the Third Army, September 14, 1941. Lt. Gen. Leslie J. McNair commented on the situation:

> "It is appropriate to make clear at the outset why gas was barred from the maneuver. There is no implication that gas is unimportant, or that it will not be employed in the future. The fact is, however, that gas has not yet been employed in the current wars abroad. Accordingly it seems unnecessary and inappropriate that we here complicate our training by introducing gas - either actual

or simulated - especially in view of the umpiring complications involved. It will be sufficient to introduce gas in our training if and when belligerents use it."

Three chemical units participated in the Louisiana maneuvers, viz: Company "C", 2d Chemical Regiment, 3d Chemical Company (Dep.) and 3d Chemical Company (Maint.).

Company "C", 2d Chemical Regiment was attached to the V Corps throughout the entire maneuver period and generally operated as part of the Corps Tank Destroyer force. Its principal function was either to stop enemy tanks by the use of smoke or to so slow them down in order that anti-tank weapons could be gotten into position for their destruction. The efficient work of Company "C" was commended by The Commanding General, V Army Corps, in a critique delivered at Camp Polk.

The 3d Chemical Company (Dep.) - activated June 1, 1941 - arrived in Lake Charles July 29th and continued there intact, except for a detachment at Mansfield, Louisiana (August 11-28, 1941), of one record section

and one service platoon until September 17, 1941. It then moved to the vicinity of Crowley, Louisiana. It established and maintained Army chemical depots in adequate space as follows:

Lake Charles, Louisiana (Warehouse) July 29-September 16.
Mansfield, Louisiana (Warehouse) August 11-29.
Crowley, Louisiana (Tent) September 17-27.

Gas Discipline Gauged

The 3d Chemical Company (Maint.) - activated May 15, 1941 - arrived in Lake Charles August 10, 1941. It was moved to Camp Polk, Louisiana, August 16, 1941, for the purpose of spraying CNB in solution, of testing - by directive of the Chief, Chemical Warfare Service - a new type of CN pot, of setting off simulated mustard mines and of carrying out such miscellaneous measures as the Army Chemical Officer might direct to gauge the gas discipline of the Third Army as a whole. However, the lack of specific approval for the use of chemicals and danger of accidents to civilians curtailed such functioning. The company was withdrawn to Lake Charles on September 11th. From then on until the termination of maneuvers it was inactive.

By General Order No. 31, Third Army Headquarters, dated August 8, 1941, command of the 3d Chemical Company (Dep.) and 3d Chemical Company (Maint.) during the maneuver period, passed to the Third Army Chemical Officer. By paragraph 1, Third Army Memorandum (unnumbered), dated August 8, 1941, the scope of the command was defined as follows: "Command will be principally tactical and so far as practicable routine administration will be performed by the A.G. Efficiency reports will be prepared on unit commanders by the Special Staff Officers or indorsed by them as the case may be. In general, command will be exercised in the same manner that a battalion, brigade, or corps commander exercises his authority."

Command of the chemical service companies - of which the structure of the field army appears to call for seven, viz: a depot, a maintenance, an impregnating, a laboratory and three decontamination companies - should, it is believed, for efficient training be a normal function of the Army Chemical Officer.

The chemical officers of the various elements of the Third Army were:

Third Army	-	Col. Leigh F. J. Zerbee.
IV Army Corps	-	Lt. Col. Edward Maling.
V Army Corps	-	Lt. Col. John V. Lowe.
VIII Army Corps	-	Maj. Edward Sullivan.

During the entire maneuver period the chemical section of the Third Army formed a part of the forward echelon of headquarters.

Maj. Gen. William N. Porter, Chief of Chemical Warfare Service, accompanied by Brig. Gen. Ray L. Avery, Col. Edward Montgomery, and Lt. Col. Geoffrey Marshall visited the Third Army Headquarters at Eunice, Louisiana, on September 24, 1941.

An unkind fate placed in the hands of an enemy, the Second Army Chemical Officer, who was detained, for a time, in the Third Army Prisoner of War Enclosure.

Where might chemicals have been used to advantage provided facilities, personnel, and authority had been available? Within the Corps versus Corps maneuvers, in a region traversed by few paved roads, abounding in swamps, forests, torturous winding rivers with low lying shores, numerous defense situations occurred where persistent vesicant agents would have been of value. In GHQ directed exercises the Third Army was on the offensive, following up a rapidly retreating foe, with its own flanks protected by large streams, viz: the Red River and the Sabine River. Here the tactical situation might have warranted the occasional use of chemical agents in local situations, perhaps of a non-persistent type.

Smoke can impede and demoralize armored unit attack and it was so used. It can conceal approach to engagements, it may baffle, it may aid river crossings, but contrary to some teachings, it has definite tactical limitations. It may delineate positions to an enemy, it may indicate to him from what quarter a movement may be expected, taking from an attacker the element of surprise and providing a shroud instead of a protecting blanket for his effort. Traffic snarls and congestion on the few well paved arteries were a worry to those in command. Low flying airplanes, spraying persistent vesicants or dropping incendiary bombs could have tied up vehicular movement to a crippling extent. The use of incendiary bombs on wide forest areas would have rendered many positions untenable. Planes would appear to be the proper agency to lay down broad bands of chemicals or incendiaries in quantities capable of decisive effect.

CROSSING RIVER UNDER SMOKE SCREEN

WITH THE 4th ARMY

by
Colonel F. R. Garcin,
Chemical Officer.

The 1941 maneuvers of the Fourth Army troops consisted of Corps Maneuvers held in June on the Hunter Liggett Military Reservation, Calif., in which the IX Army Corps (Blue) operated against the 7th Infantry Division (Red) and the Army Maneuvers held in the State of Washington in August in which the Fourth Army was concentrated and operated against a Red reinforced corps represented by an infantry regiment.

A total of 750 smoke pots were allotted by GHQ for corps and army maneuvers.

In view of the small number of smoke pots available the attempt to spread them out over both maneuvers would have resulted in a very thin supply and ineffectual screening. It was therefore decided that all smoke pots should be made available during the corps maneuvers. This decision was particularly influenced by two factors, first in the corps maneuvers both sides were actual whereas in the army maneuvers one side was represented, and second, the area in which the corps maneuvers were held was more open than the area used during the army maneuvers and consequently afforded more necessity for the use of screening smoke.

In addition to the smoke pots there were approximately 600 land mines,

simulated mustard, in the San Francisco Depot which had been furnished for maneuvers the preceding year and not used. These were made available to the Red force, the 7th Infantry Division, which, since it was the smaller force, was expected to be on the defensive.

Infantry Personnel Detailed

The chemical supply and operations in these maneuvers were much handicapped due to the absence of chemical units. Personnel to operate the chemical supply points had to be formed by drawing from other sources, and personnel to set off the smoke pots were detailed from the infantry. The gas mask was carried by all troops engaged in both maneuvers.

Communication zone bases for the Blues were established at Fort Ord, and for the Reds at Camp San Luis Obispo.

Army chemical supply points (truckheads) were established in rear of the opposing forces. At each of these supply points a chemical officer, obtained from the Corps Area Service Command, was in command, assisted by enlisted personnel detailed from the Headquarters Company, Fourth Army, thus the flow of supply from communication zone to troops was actually effected. This movement of supply did not begin until the opening phase of the maneuver. In addition to the actual supplies the stockage and drawing of decontaminating material was simulated and records kept thereon.

The Army Maneuver Bulletin covering use of smoke provided:

"Each division will organize a chemical detachment to operate in the area of each infantry regiment of the division. Each detachment will consist of 1 officer, 1 noncommissioned officer and two privates and one 1-1/2-ton truck with driver. Each detachment will be equipped with 2 spades and one axe for purpose of fighting fire.

"These detachments will operate under control of the artillery fire umpires.

"Smoke missions fired by the artillery will be represented as prescribed in Paragraphs 27 - 28, GHQ Umpire Manual for artillery fire, substituting smoke for flags.

"Smoke candle missions prescribed by the division commander will also be executed by these detachments.

"The following ratio will be used in executing smoke missions:

1 smoke pot equals -----
(10 rounds of 81-mm. shell
(10 rounds of 75-mm. shell
(1 round of 155-mm. shell"

Speed of Attack Limited Smoke Missions

As generally experienced in these maneuvers, the movement of troops under "fire" was frequently very fast. Assaulting units were permitted to move forward, where under actual conditions of combat they would have been pinned to the ground often by hostile fire. Hence, there was less need

of smoke missions to protect men by cover as might have been the case in an actual theater of war.

During the Army Maneuvers held in the State of Washington in August no smoke or chemicals were actually used. All personnel were required to carry the gas mask. It was assumed that chemical troops had been called for and provision was made in plans for their locations. Quantities of supplies which would be required for chemical operations were computed and kept up to date.

Criticism and the Inspector

It is unfortunate that most of us dislike and resent criticism, a dislike that makes it hard for those in authority to correct errors, with the result that the sense of these uncorrected errors often piles up till there is a sudden explosion over some comparative trifle, really the sum of condemnations for a series of faults. Inspectees should therefore be trained to accept criticism cheerfully. The wind can often be taken out to the corrector's sails by immediately admitting the error. After all, his main object is to see that it does not occur again; if he sees that the culprit is equally decided in the matter he is satisfied, and also pleased at not getting the usual dirty looks.--Lt. Col. E. G. Hart, D. S. O., from the article "On Organization" in The Royal Air Force Quarterly.

The Chief of Staff Says ...

The technique of 1917 is outmoded today. The specialized training for a particular type of operation gives way to the necessity for perfect teamwork in fast-moving operations over any type of terrain. A high degree of technical and tactical knowledge is necessary, from the individual soldier to the commanders of the highest units. Skilled initiative is a mandatory requirement. The complicated coordination of fire-power, ground and air, must be managed at top speed, and for a surprising variety of weapons, with little or no opportunity to rehearse the procedure or to gain familiarity with the ground.--Gen. George C. Marshall, Speech at 1941 American Legion Convention.

The Commands Are Learning

War places a terrifically high value on wise decisions. Any war reveals abundant evidence of plans which proved to be ill-advised. The failures of generals are more grisly even than those of physicians and surgeons; they need broad acres for burying their mistakes. Without denouncing the military obtuseness that appeared after the last war or bemoaning the blunders made by the vanquished in the present struggle, one may note that both the British and American commands are learning.--From The Impact of War By Pendleton Herring.

First Army troops charging through a smoke screen.

ACTION IN MANEUVERS

Decontamination exercises played an important part.

Maj. Gen. William N. Porter presenting to Joseph G. Smith, a civilian employee of the Pittsburgh Store Fixture and Equipment Company, Blairsville, Pa., on the "We the People" program of the Columbia Broadcasting System, Tuesday, December 30, 1941, from 9:00 to 9:30 PM, a citation from the Hon. Robert P. Patterson, the Under Secretary of War.

WORKER CITED FOR BRAVERY

Wins Commendation from General Porter and Under Secretary of War for Act Preventing Possible Explosion

As typically American as the name Joe Smith is a certain defense worker over in Blairsville, Pa. And his name happens to be Joe Smith.

Joe was using an acetylene torch when a flashback ripped the hoseline open, bursting it into flames. The oxygen line was ruptured by the heat and the resulting oxy-acetylene flame melted the safety plug on top of the acetylene tank, releasing large quantities of acetylene gas, which produced a flame of intense heat. Lt. J. F. Munn, Plant Protection Inspection Officer, was right on the job and extinguished the flame three times with a carbon dioxide extinguisher, but it became spontaneously ignited each time due to pre-heating of the acetylene. Unless the main valve on the acetylene tank could be shut off and thus permit acetylene to escape upward only, a major fire or explosion might result.

Recognizing this danger, Joe thrust his hand into the hot mass of oxy-acetylene flame, grasped the handle, and closed the valve. The handle was so hot that it twisted out of shape. Joe burned his hand seriously.

Maj. Gen. William N. Porter, Chief of the Chemical Warfare Service, and Joe Smith, appeared on the "We the People" program, Tuesday evening, December 30, before a nation-wide radio audience. At that time, Joe was presented a personal citation from the Hon. Robert P. Paterson, Under Secretary of War.

Heroism Not Confined to Front Lines

General Porter said, "We all know that soldiers in line of battle are often called upon to perform acts of daring. But it took just as much courage to grasp that red hot valve wrench as would be required to face a machine gun. Joe Smith, I am extremely happy to be able to give you personally this message from the Under Secretary of War, who says, "Your country is indebted to you, Joseph Smith, for an act of courage above and beyond the call of duty. There is now no official manner in which such bravery as yours can be recognized, but I am proud to make this unofficial citation a matter of record. At a later date it will, I hope, be possible to recognize officially the valor and sacrifice of men like you. In this war, as in no other war in our history, heroism will not be confined to the front lines."

WAR DEPARTMENT CIVILIAN DEFENSE COURSES GRADUATE OVER 500 in 1941

Program Expected to be Expanded in 1942 to Graduate 5000 Students

Colonel George J. B. Fisher, C. W. S.,
Chief, Civil Defense Division,
Office of the Chief, Chemical Warfare Service.

In 1941, the Chemical Warfare School graduated 508 students from the Civilian Defense Courses now being held in cooperation with the Office of Civilian Defense. These students, who comprised firemen, policemen, and directors of air raid protection, represent 314 cities in 40 states.

Col. George J. B. Fisher instructing a group of students in the Civil Defense School, Edgewood Arsenal, in gas mask nomenclature, when he was Executive Officer of the Chemical Warfare School last summer.

Maj. E.P.H. Gempel describing to a group of Civil Defense students an exhibit in the Chemical Warfare Museum, Edgewood Arsenal.

Since Japan attacked the United States, the problem of instructing civilians has taken on new importance. Plans under consideration to augment the teaching facilities are now expected to materialize with the establishment of permanent schools in other sections of the country.

The day war was declared and potential bombing threats arose along the West Coast, the Office of Civilian Defense requested the War Department to undertake immediate instruction of key personnel in principal cities in the Western Defense Command. Eight officers were dispatched on December 10th to San Francisco to function as instructors in special schools arranged by the Director of the Ninth Regional Office of Civilian Defense. These instructors, under the direction of Col. George J. B. Fisher, were Maj. Harold S. Brayton, Maj. Willard A. Johnston, Capt. Arthur G. Rogers, Capt. Vernon McGuckin, 1st Lt. Carl V. Burke, 1st Lt. Benjamin L. Mattingly, 2d Lt. R. C. Burn, and 2d Lt. W. L. Surovik, Jr., all from the Chemical Warfare School at Edgewood Arsenal.

To further meet the contingencies of the emergency, a special course of intensified training in air raid organization was held at the Chemical Warfare School during the week of January 5. This class was attended by sixty officers of field grade, representing all branches of the Army. Upon completion of this course, these officers are being assigned to staffs of the several Regional Directors of Civilian Defense.

53,000,000 Must Have Instruction

The regular Civilian Defense Courses at Edgewood, now in their seventh month, will be continued throughout the year as a feature of the broad instructional program of the Office of Civilian Defense. It has been estimated that 53,000,000 people must have some form of instruction in air raid protection in order to assure adequate dissemination of necessary knowledge to the entire public. This will require the services of 5,000 instructors whose job will be to educate citizens in their local communities.

The twelfth two-week course opened on January 12th, with an enrollment of 50. Students for the course will continue to be selected by State and local Defense Councils according to quotas set up by the United States Director of Civilian Defense.

At present, applicants for the courses are being selected mainly from the three 300-mile strategical areas running along the Eastern Seaboard, the Gulf Coast, and the Pacific Coast. Later, when facilities permit, representatives of more states will be accepted. Many inland states, however, have already sent representatives who have graduated and returned to their local communities to spread knowledge of proper technique in air raid protection.

As in the past, all expenses in connection with attendance at the school are borne by the individual students. They will live in school dormitories and eat in the student officers' mess.

Civilian Defense courses now cover 83 hours of instruction, classes being in session from eight o'clock in the morning to five o'clock in the afternoon, with several evenings of scheduled work.

Capt. Vernon E. McGuckin instructing a group of Civil Defense students in the identification of chemical agents, Edgewood Arsenal.

*"SPIRIT OF '42"**

Broadcast from Edgewood Arsenal, Maryland, 2:00 to 2:30 P.M. - January 4, 1942.

Half Hour Radio Program on a National Hook-up of the Columbia Broadcasting System and devoted to the Chemical Warfare Service.

MUSIC -	ASSEMBLY - - - - TRUMPETS INTO DRUM-ROLL
ANNOUNCER -	The Spirit of '42!
MUSIC -	SEGUE TO STARS AND STRIPES FOREVER---FADE FOR
ANNOUNCER -	The Columbia Broadcasting System brings you another program in this series of first-hand stories of our Army and our Navy ... the Spirit of '42! Today our broadcast comes to you direct from the great Edgewood Arsenal, birthplace of the United States Chemical Warfare Service, with actual demonstrations of gas and incendiary-bomb defense, and an important message from Maj. Gen. William N. Porter, Chief of the Chemical Warfare Service!
MUSIC -	END STARS AND STRIPES FOREVER
ANNOUNCER -	The Training Battalion Band of the Chemical Warfare Service salutes the nation with the March, Invercargill.
	INVERCARGILL MARCH---FADE FOR
ANNOUNCER -	Here is Brewster Morgan, producer of Columbia's Spirit of '42.
MORGAN -	In these days when we are young in the war, the question of the use of chemical agents ... gas, smoke, incendiary weapons ... occupies the minds of many of us. We remember the lurid tales of the use of gas in World War I; we have read about and have seen the pictures of incendiaries in the Battle of Britain. And we wonder if America is attacked, will our enemies use incendiary bombs?

**Actual radio script used for the broadcast.*

-----New York Daily News.

Scene in the gas mask factory of Edgewood Arsenal.

Will gas be used? And how are we prepared to defend ourselves against these weapons that modern science has developed? In World War I, with the experiences of the French and British to warn us, our Army formed the Chemical Warfare Service. It served with great distinction in France - both as a defensive and as an offensive organization. Then when peace came, the Chemical Warfare Service was relegated slightly to the background - until the emergency gripped us again. Today the Chemical Warfare Service, backed by the ablest chemists of American industry, is working at top speed to restore our native efficiency in this arm of the service ... both for defense at home and for offensive action in the field. For example, here at Edgewood Arsenal our present gas masks are manufactured under the supervision of the Chemical Warfare Service and are perfect protection against gases of all kinds. Rush Hughes is now at the gas mask factory here on the Arsenal Reservation, and he is going to talk to you now about these masks as he watches them made. He is going to show you how and why they are such excellent protection. All right Rush, come in.

SWITCH TO RUSH HUGHES AT MASK FACTORY

HUGHES - This is Rush Hughes at the gas mask factory in the Plants area of this great eight thousand acre tract that is the Edgewood Arsenal. Here ... in the center of this busy action ... the sound of which you can hear on all sides ... nearly two thousand people are working twenty-four hours of every day ... seven days of every week, in the making of vitally important gas masks. To understand what a gas mask is ... you must first understand what it is not. It is Not ... definitely not ... an oxygen supply ... contrary to anything you may have heard. The whole purpose of a gas mask is to supply a device which will first keep any and all known war gases from getting into the lungs through the nose and mouth and second ... to provice a means by which all known gases may be first filtered and then rendered harmless, so that nothing but good air gets into the system when breathing is continued during a gas attack with the mask on. Now here are three of the most important people in this gas mask factory to show you how these things are made. Although there are nearly one hundred complete operations in the manufacture of a mask ... the three main pro-

cesses are the carrying case ... the canister that contains the elements which filter out smokes and counteract the gases and ... third ... the complete facepiece assembly. Each of these three operations are supervised here by a floor foreman and here they are: Mrs. Naomi Carmen ... in charge of Carriers; J. C. Dietz ... in charge of Canisters and Mrs. Pearl Lackey in charge of Facepiece Assembly. Mrs. Carmen, will you please answer a few questions about the making of the Carrier cases which I see all the men on this post are toting their masks about in ... and, in fact, everyone of the workers here in the factory has a mask slung over the back of his or her chair as they work. How are these canvas carriers made, Mrs. Carmen?

MRS. CARMEN - Well, Mr. Hughes, they're stamped in two pieces, sewn on different types of sewing machines, made to go over the right shoulder, and designed so the facepiece can be pulled out quickly and placed over the face.

HUGHES - Thank you and now ... here is Jack Dietz ... who supervises the operation of gas mask canisters which contain the activated charcoal .. the other chemicals and the smoke filters that are one hundred per cent effective in counteracting the war gases that might be used against us. Mr. Dietz, will you tell us something about these canisters?

DIETZ - You have already covered the effectiveness of this canister we use, Mr. Hughes... Probably the main reason for that is twofold. First, our charcoal and chemicals .. and the way we pack them, together with the filter we use, are so carefully tested ... time after time again.. that there is no chance in the world of one of our masks failing. I think you saw all the vacuum tests and the inspections that we go through to guarantee one hundred per cent effectiveness.

HUGHES - Thank you Jack Dietz and now Mrs. Lackey if you'll step over here I'd like to run out some queries on the making of the all-important facepieces that you stand guard over, or maybe you'd just like to start and outline the process yourself.

MRS. LACKEY - Facepiece is molded rubber. One size fits ninety-five per cent of users. Lens is molded plastic, fitted into grooved eyepieces and crimped into place. Any corrections necessary are done by hand. Absolute tightness of facepiece is guaranteed by a vacuum test.

HUGHES - Mrs. Lackey ... would you say this checking and rechecking was the reason why the Chemical Warfare Service can say ... with modest pride ... that the gas masks made here are absolutely perfect?

MRS. LACKEY - Yes, I would Mr. Hughes. We workers in the gas mask plant of the Edgewood Arsenal are thoroughly alive to our responsibility and trust, and we are determined to live up to it.

HUGHES - Thank you very much. Ladies and gentlemen you have heard from three key workers an outline of the manufacture of gas masks here at the Edgewood Arsenal. Now,in a few moments we are going to make some actual tests with gases, but meanwhile here is Mr. Willis Cooper to tell you something about these gases.

COOPER - First, let me tell you how gases are calssified. First, the lung irritants, phosgene, diphosgene, and chlorpicrin which cause very serious effects. The second classification is the vesicants, or blistering gases, represented by mustard gas, lewisite, which cause serious burns. The third group is called sternutators which cause sneezing and vomiting making the people shed their masks if some of the gas should get inside. These are usually diphenylchloride, ethyldichlorine, and diphenylchlorarsine. Let me go on now to the fourth group ... tear gases ... The best known of which are chloracetophenone, and brombenzylcyanide. And now let me make this one point,which is tremendously important. Our present gas masks, as manufactured under the supervision of the Chemical Warfare Service, are perfect - I mean perfect - protection against all these gases, and against all others of their type. Remember, our Chemical Warfare officers are not interested merely in protecting you against our own gases, but against probable enemy gases; and they know what gases the enemy, the Japs, the Germans, or the Italians are able to use. Now Rush Hughes has stepped outside the gas mask factory here and he's going to give you a demonstration in the use of the mask,as well as an exercise on gas identification. All right Rush.

SWITCH TO RUSH HUGHES

HUGHES - O. K. I have it ... Thank you very much,and while Mr. Cooper has been talking,M. Sgt. Joseph Leslie of Philadelphia, Pa., who is here with us has gone over to the assembly line of the gas mask factory and taken off one of the completed masks and now

is standing out here beside me with it and is going to give a demonstration of the actual way that a gas mask should be put on. All right Sergeant Leslie.

SWITCH TO SERGEANT LESLIE

SGT. LESLIE - All right Mr. Hughes thank you. The gas mask, of course, must be carried in the right position at all times. At the sound of the alarm, the first thing you do is hold your breath. Then, with the right hand, remove and dispose of the head covering. At the same time open the flap with the left hand of the carrier. Insert the right hand and pull out the facepiece by firmly grasping it at the diaphragm assembly. Bring it up about face high in this manner, grasp it firmly with both hands and stick the chin well out. Next, and this is a very important movement here, keep the head perfectly still. By using the hands and arms only in a circular motion, bring the facepiece up to the face, continuing by bringing the straps over and behind the head. Check with both hands to see that it fits properly, and then the next thing ...

HUGHES - He has it on now ladies and gentlemen. You may be able to hear him talking through it. Go ahead Sergeant Leslie.

SGT. LESLIE - Then, the next step, you've got to clean out any gas that you might have gotten out of the air. You grasp the outlet valve with the left hand and blow out just as hard as you can.

(SOUND OF BLOWING)

HUGHES - O. K., there's the demonstration of how to put on a gas mask by Sergeant Leslie, and now, we have five selectees out here. We're going to have a demonstration of them sniffing some of these known war gases and getting better acquainted with the medium in which they're going to work. Here's Pvt. John P. O'Brien of Richmond Hill, Long Island. Will you sniff that bottle please?... What do you smell?

PVT. O'BRIEN - It smells like horse-radish.

HUGHES - Well, what kind of gas is it?

PVT. O'BRIEN - Mustard Gas.

HUGHES - Thank you very much. Now here's Pvt. Robert C. Riddlemoser of Mount Airy, Md. Will you sniff that please? What does it smell like?

PVT. RIDDLEMOSER - It smells like some kind of candy, licorice, I think it is.

HUGHES - Licorice? And what kind of a gas is it?

PVT. RIDDLEMOSER - Chlorpicrin.

HUGHES - Thank you very much and now, one more. Pvt. Kenneth E. Kitchen of Green Bay, Wis. That's got me in the eyes, too. What do you smell there, sir?

PVT. KITCHEN - It smells like flowers to me, sir.

HUGHES - And what kind of a gas is it?

PVT. KITCHEN - That's Lewisite, sir.

HUGHES - Now, we have Pvt. Leonard P. Gibbs of Norfolk, Va. What do you smell?

PVT. GIBBS - That smells like new mown hay or green corn.

HUGHES - And what kind of gas is it?

PVT. GIBBS - Phosgene.

HUGHES - Phosgene gas and one more demonstration. Pvt. Leonard W. Buck of Fresno, Calif.

PVT. BUCK - It smells like an apple blossom or something similar.

HUGHES - And what kind of gas is that?

PVT. BUCK - It's a tear gas, CN.

HUGHES - Thank you very much. There's the demonstration of the sniffing test by five selectees here outside the gas mask factory and now we switch you back to Brewster Morgan at Conaty Hall.

SWITCH TO CONATY HALL

MORGAN - You have heard about gases and gas masks; things which, in modern warfare, concern the civilian as well as the fighting man in the field. We take you now to Washington, D.C., where the Chief of the Chemical Warfare Service, Maj. Gen. William N. Porter is waiting to bring you an official message of the greatest importance. General Porter, Chief of the Chemical Warfare Service, from Washington.

MAJ. GEN. PORTER - We of the Chemical Warfare Service are very proud of Edgewood Arsenal. I am delighted that you are having this opportunity to hear of some of the work which goes on there. I am glad too, to have this chance to talk to you because I should like, if I can, to allay some of the fears which have been expressed to me by telephone, telegraph, and mail, concerning the possibilities of gas attacks along the coasts and the effects to be expected

should such attacks be made. In the first place, under conditions as they exist at present or as are probable within a reasonable time, I do not expect that gas will be used by our enemies anywhere in the Continental United States. Should enemy airplanes, by some difficult and devious method, be flown over our coasts, it is to be expected that, since their loads are necessarily limited,high explosive bombs will be the weapons they will carry. This is for the reason that if enemy carriers are to be risked for raiding attacks it will be for the primary purpose of destroying military objectives, and for this purpose high explosive bombs are far more efficient than gas. Furthermore, no small number of planes, even if fully loaded with gas bombs, could carry enough to be of any great importance; and protection against any such token gassing is rather easily provided for our citizens if they understand a few simple facts. The Office of Civilian Defense is in the process of providing gas masks for those citizens who live within raiding distance of our coasts. Even without masks, a carefully closed room on the first or second floor of the average dwelling would be proof against small amounts of gas released in the neighborhood unless there was a lighted fire or chimney which produced a draft in the room and dragged the gas into it. Moreover, civilians could, and would, rapidly evacuate an area which had been contaminated with mustard gas. In collaboration with the Office of Civilian Defense, we have, for the past six months been conducting special courses at the Chemical Warfare School at Edgewood Arsenal,for the instruction of selected groups of firemen,policemen, and other civic leaders in the methods and technique of protecting the public against air raids. More than 500 selected men from coast to coast have completed this course since the first of July. Immediately after the outbreak of this war, similar schools were established in larger cities of Calif., Ore., and Wash. The graduates of these schools understand thoroughly how to protect civilians in their communities from the possible effects of any token gas raids as well as from the results of an attack, which is much more likely to happen in which incendiaries are used. Gas is an effective weapon in the field. Soldiers in battle or crowded into bivouacs have great difficulties in protecting themselves against it; but where tightly closed rooms exist and soap,hot water,and kerosene are

easily available for washing, as they are in cities, there is no reason why the average householder should fear it in any quantities which are likely to be put down at this stage in this war. Breathe freely.

ANNOUNCER - We now return you to Edgewood Arsenal.

SWITCH TO ARSENAL

Here at Conaty Hall at the Arsenal, the Training Battalion Band plays for the first time on the air a new Chemical Warfare Service Marching Song, written by a member of the band, Pvt. Paul MacKenzie, and sung for us today by Pvt. Bob Rice.

BAND - CHEMICAL WARFARE MARCHING SONG

ANNOUNCER - And now Willis Cooper.

COOPER - Perhaps we have given you the idea that most of the operations here at Edgewood are manufacturing and procurement. That's not exactly the case, since this is the Chemical Warfare Training and Replacement Center. So I've asked Capt. Kenneth A. Cunin, Post Intelligence Officer, to tell us something about the training of Chemical Warfare Troops. Captain Cunin.

CUNIN - The men who come here get four weeks of basic soldier training exactly the same as soldiers of the other arms; and then come four weeks of specialized training in aviation, laboratory, depot, and maintenance services, as well as the very important training for combat units.

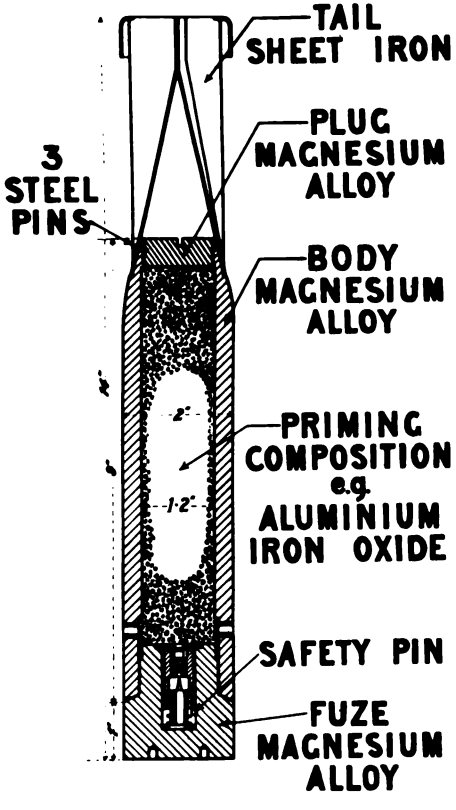
COOPER - What about these combat units, Captain Cunin?

CUNIN - They are the chemical mortar companies, part of the combat battalions, which are presently activated. When the eight weeks training is finished, the men are sent wherever the War Department needs them. This might be to any one of the many army posts throughout the service.

COOPER - Then the Chemical Warfare Troops are combat troops, Captain?

CUNIN - Yes, they are, and in addition, they are trained in the handling of all chemical warfare equipment, weapons and materiel much of it highly specialized technical training.

COOPER - Thank you very much Captain Cunin and now Rush Hughes is ready to present a demonstration of incendiary bombs at one of the demonstration areas here on the post. All right Rush, take it please.



TYPICAL KILO MAGNESIUM (ELECTRON) INCENDIARY BOMB

HOME OFFICE (A.R.P. DEPARTMENT)
INCENDIARY BOMBS INSTRUCTIONAL DIAGRAM No. 1

SWITCH TO RUSH HUGHES AT DEMONSTRATION AREA

HUGHES - All right, this is Rush Hughes, and here at one of the demonstration areas at Edgewood Arsenal, we present a picture that deserves the full attention of every listener in America. From the original headquarters of the Chemical Warfare Service in the United States we bring you the latest and most authentic word on incendiary bombs, what they are, and what to do about them. Here is Maj. William E. Caldwell, acting director, Department of Incendiaries of the Chemical Warfare School at Edgewood Arsenal. Major Caldwell, what is an incendiary bomb?

MAJ. CALDWELL - An incendiary bomb as used by the Germans is a contraption that weighs a little more than two pounds. It is 2 inches in diameter and 14 inches long. When many are dropped, and a single plane can easily carry 500 of them, they have the power to quickly set cities on fire. A German incendiary, if undisturbed, will burn for about 15 minutes at about 3,000 degrees Fahrenheit. It will fire burnable material it contacts, a house, a fuel storage tank, a wheat field; anything inflammable.

HUGHES - Well, that makes the care of these little property wreckers --- a very important matter. Tell me sir, how do you control an incendiary?

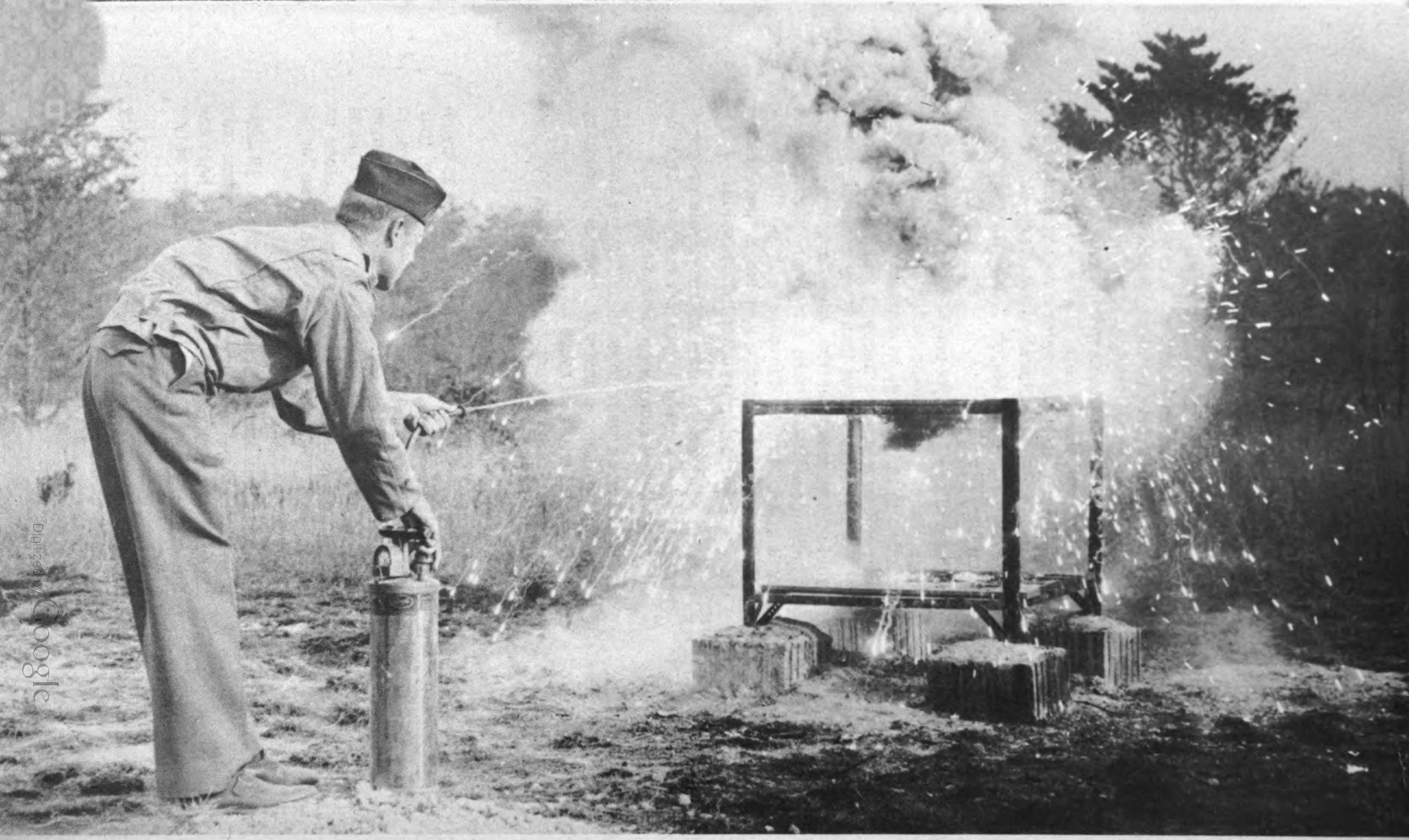
MAJ. CALDWELL - There are three ways to do that. Two of them are right, one of them is wrong. I have an incendiary here which I will now touch off.
If you take your microphone down close to it you may be able to hear it hiss.

TOUCH OFF INCENDIARY

HUGHES - All right sir, lets you and I walk out here to these incendiaries. Here, there are one, two, three, four of them on top of boxes and one of them here is beginning to sputter considerably. I don't know how close I can get down to it; It doesn't make very much noise but I'm going to get as close as I can. Is it all right for me to go in close Major Caldwell?

MAJ. CALDWELL - Yes, only one magnesium incendiary in 12 have high explosives in them. This one is meant only to burn and you can go as close as the heat and the sputtering will allow. Do you hear it better now?

HUGHES - Well, let's see how close I can get; it's a pretty



Effect of carbon tetrachloride on an incendiary bomb of the thermit type.--Edgewood Arsenal, November 10, 1941.

hard proposition. I understand they burn at about 3,000 degrees Fahrenheit but I'm right down now and I think my microphone is within 6 inches of the top of that burning one. Tell me, what do you do to keep these things under control, Major Caldwell?

MAJ. CALDWELL - Dry sand poured over the bomb and then the burning material rolled over on sand keeps it from burning through the floor and partly smothers the burning metal. And you may even want to scoop the whole business with an iron shovel and drop it into a bucket of sand.

HUGHES - Yes,sir,then what do you do, throw it out the window?

MAJ. CALDWELL - No, there might be somebody passing by and they wouldn't welcome such a hot reception but you can carry it out in the back yard and let it sputter out in lonely splendor.

HUGHES - Well, now suppose you are just fresh out of sand, Major, and one of these things comes calling on your attic - then what do you do?

MAJ. CALDWELL - Then you give it the water treatment,but here you have to watch your step. I'll start another bomb going and show you how to handle it. There, now you take a garden hose or a small water hand pump and pump with a spray nozzle on the hose and you gently spray the visitor from nose to finn.

HUGHES - Let's get in close and hear this, if we can.

MAJ. CALDWELL - At the same time that you are spraying water on the burning bomb you are wetting down the boards all around it. The water makes the bomb burn up more rapidly,and at the same time curbs the fire around about it.

HUGHES - All right, I'm going to bring the microphone down once more. Keep that spray going on there will you? I'll bring it down once more and let you hear exactly what happens when a spray is put on one of these magnesium bombs.

MAJ. CALDWELL - Now put a little bit of water with this stream on that bomb and we'll have a little greater sputtering. Will you get down a little closer, sir, and we'll see.

HUGHES - All right, here we go, put her on.

THE HISSING SOUND

HUGHES - I can't get quite as close under that sort of a treatment, sir.

CONTROLLING WITH SAND

CONTROLLING WITH WATER

TO FIGHT A BOMB WITH WATER, YOU NEED TWO MEN AND SPECIAL EQUIPMENT. REMEMBER, YOU CAN'T PUT OUT THE BOMB — YOU FEED IT WATER, TO BURN OUT!

ONE MAN PUMPS 80 STROKES A MINUTE TO KEEP A STRONG ENOUGH PRESSURE TO THROW A JET 30 FEET, AS SPRAY, 15 FEET. ONE MAN FIGHTS THE FIRE.

JET ON SURROUNDINGS!

SPECIAL DOUBLE ACTION PUMP WITH 30 FEET OF HOSE AND SPECIAL NOZZLE NEEDED.

YOU USE UP A BUCKET IN 1½ MINUTES

SPRAY ON BOMB

A THIRD PERSON IS MOST USEFUL TO CHECK OTHER POINTS FOR FLAME, REPLENISH WATER AND RELIEVE PUMPER.

AMPLE STORAGE OF WATER SHOULD BE PROVIDED IN ADVANCE, AS WATER MAINS MAY BE BROKEN BY HIGH EXPLOSIVES AND PRESSURE LOST! FILL THE TUB, EXTRA PAILS AND DON'T FORGET IN A PINCH —— THE CONTENTS OF HOT WATER OR HEATING BOILERS!

NEVER THROW THE CONTENTS OF A WATER PAIL ON A BOMB!

... IT WILL SCATTER WITH EXPLOSIVE VIOLENCE!

IF CONTROL OF THE BOMB SEEMS DOUBTFUL, HAVE AN ALARM TURNED IN, BUT CONTINUE FIGHTING THE BOMB UNTIL HELP ARRIVES OR SUPPLIES ARE EXHAUSTED!

1 LEARN **NOW** HOW TO CALL

2 LEARN **NOW** LOCATION OF NEAREST ALARM...

MILTON CANIFF

MAJ. CALDWELL - All right, maybe we ought to do what the housewife attempts to do erroneously upon a bomb. There's a bucket of water. Suppose you try throwing this bucket of water upon the bomb, and let's notice the noise.

HUGHES - All right, give it to me. Throw it! Come on! Here we go ... I see what you mean. That isn't what you should do, is it Major?

MAJ. CALDWELL - You should not do that.

HUGHES - You shouldn't throw a stream of water on one of these incendiary bombs. Now, one thing more, please. Are the Japs using these two-pound incendiaries that can be carried 500 or more to a plane?

MAJ. CALDWELL - As far as we know the Japs are not using magnesium incendiaries. The Jap incendiaries have all been 32-pound thermit bombs up to now. Of course, not so many of these 32-pound bombs can be carried by each plane but those that do land will start larger fires. Since the bomb action is so rapid in the formation of white hot liquid iron, there is no fighting of the bomb, but fighting of the fire that is caused by them.

HUGHES - Major Caldwell, what advice would you give these people on the subject of preparation against a possible air attack in which incendiaries are used?

MAJ. CALDWELL - Mr. Hughes, I would say this to those people. The Nation needs fire fighters, volunteer and auxiliary. We have the organizations already, but there are not enough people who have taken the time and trouble to find out what to do if an incendiary lands on their own roof. I advise all these people to find out how to combat this possibility now. There won't be time to run for instructions after an air raid begins.

HUGHES - That's very true, Major Caldwell, but, please tell me exactly what I should do in my own home right now to prepare against any such attack.

MAJ. CALDWELL - You should have at least one bucket of sand on every floor of the house, - expecially in the attic. If you run out of sand and have to use water, then be sure that you only use spray on the bomb. Never douse it.

HUGHES - Yes, sir. I found that out. Dousing an incendiary with a stream of water is just about as safe as throwing a bunch of fire crackers into a hot stove. Thank you, Major Caldwell, for your expert in-

formation on the handling of incendiary bombs, and now back to Conaty Hall.

SWITCH TO CONATY HALL

MORGAN - This is Brewster Morgan. Now let us hear a word from Brigadier General Avery, commanding officer of Edgewood Arsenal and head of the Chemical Warfare Training Center and School. General Avery is in direct command of these men you've heard today here, and his message is interesting to us all. Here is General Avery.

GEN. AVERY - The Spirit of '42 has brought to you today a highlighted radio picture of this, the first arsenal of the Chemical Warfare Service. In addition to the features which have marked the program, we have many other industrial and troop installations, including the important Chemical Warfare School and the Chemical Warfare Service Replacement Training Center. Through the Chemical Warfare School each month pass hundreds of military and civilian students who are especially trained to defend all of us against chemical agents and incendiaries. The replacement training center is made up of troops hailing from all parts of the country. Here soldiers are carefully schooled in the latest and most modern techniques of chemical warfare so that they may take their places in our field armies. Through every arsenal function both civilian and military there is a high enthusiasm for every activity that lends itself to ultimate victory. The men in the replacement center, the Second Separate Chemical Battalion, and other military units of this station, have an exceptional esprit de corps. Your sons entrusted to us for training are measuring up as soldiers in every sense of the word. You are proud of them as sons and we at Edgewood Arsenal are just as proud of them as soldiers.

BAND - "STARS AND STRIPES FOREVER". Hold Background.

ANNOUNCER - Today Columbia's Spirit of '42 brought you a program direct from the Edgewood Arsenal, birthplace of the American Armies Chemical Warfare Service and present home of the Chemical Warfare School Training and Replacement Center. The Spirit of '42 is one of Columbia's programs devoted to the furthering of America's war effort and produced for Columbia by Brewster Morgan. Willis Cooper writes the Spirit of '42 - Guy della Cioppa directs, in the field. Music today was by

the Training Battalion Band of the Chemical Warfare Service, under the direction of Tech. Sgt. Wayne Lovejoy. Joe King speaking, this is the Columbia Broadcasting System.

DISINFECTING GAS MASK FACEPIECES

Comprehensive Discussion of the Merits and Demerits of Various Known Methods of Disinfecting Facepieces

By Major W. E. Caldwell, C.W.S.

Cresol or lysol solutions, which are often used in the disinfection of gas mask facepieces, are quite disagreeable to handle because of their persistent odor and corrosive action on skin. Lysol is a protected trade name for a solution of 50% cresol and 50% vegetable oil soap. Cresol and lysol somewhat attack rubber and lately have been found unsuitable for use on masks with plastic eyepieces. A three per cent formaldehyde solution has been suggested and is now in use for disinfection of training masks with plastic eyepieces. When formaldehyde is used for this purpose, personnel doing the work need to wear masks and rubber gloves during the operation. Formaldehyde is quite irritating to the skin and respiratory tract; some people are allergic to it, and its odor is persistent. The purpose of this article is to discuss and evaluate the advantages and disadvantages of these two methods as well as of other methods which could be substituted if desired.

Lysol Procedure Outlined

In the method mentioned above a two-per-cent solution of cresol or lysol is used. (About 3 ounces of the chemical to one gallon of water.) A supply of small, clean rags and rubber gloves should be on hand. To prevent the solution's getting into the canister during the disinfection, the latter should be elevated above the facepiece by placing the carrier containing the canister on a table or shelf, with the facepiece hanging down. Do not turn the facepiece inside out.

Saturate a clean rag with the disinfectant and sponge the entire inner

surface of the facepiece, including the outer and inner sides of the deflector.

Pour about a teaspoonful of the disinfectant into the exit passage of the angletube. Press the sides of the outlet valve with the thumb and finger to force out the disinfectant. Do not shake off the excess.

Allow all disinfected parts to remain moist for about 15 minutes and then wipe with a dry rag. After disinfection the facepiece should be left hanging until thoroughly dry before it is replaced in the carrier.

For plastic lens masks a three-per-cent formaldehyde solution is used, procedure being the same as above outlined, except that the worker on mask disinfection has need to wear a mask himself as protection from formaldehyde fumes.

Various chemicals are compared as to their disinfecting qualities according to their phenol coefficient, which may be defined as the ratio of the dilution of a disinfectant required to kill the Hopkins strain of typhoid bacillus under carefully controlled conditions, in a specified time, compared with the dilution of phenol required for the same organism under the same conditions. Usually 2.5 and 15 minute time limits are used and the coefficient is calulated from the average of the two.

For example, if 1:80 and 1:110 dilutions of phenol kill in 2.5 and 15 minutes respectively, and the corresponding dilutions of a disinfectant under test are 1:375 and 1:650, then, the phenol coefficient of the disinfectant is

$$1/2 \quad \frac{(375)}{80} + \frac{(650)}{110} = 5.30$$

TABLE I

PHENOL COEFFICIENTS FOR VARIOUS ANTISEPTICS*

Substance	Temp. °C	Values Obtained With Following Test Organisms:	
		Staph. Aureus	B. Typhosus
Formalin	37	0.3	0.7
Chloramine solution	37	133	100
Dakins solution	20		0.78
Lysol	20	3.2	5.0
Creolin			9.5
Ethyl Phenol	25	6.0	7.4
n-butyl Phenol	25	50.0	68.0
Hexyl Resorcinol	20	150	72
Mercurochrome	20	1.7	
Merthiolate	20	40-50	40-50
Mercuric Chloride	20	143.0	100.00
Tincture of Iodine	20	38.0	
Hydrogen Peroxide	20		0.01
Metaphen ($C_{11}H_{11}O_7NHg_2$)	20	1500.0	

**Table taken from Handbook of Chemistry, Lange, 3d Edition Page 1441.*

***Time of exposure was 7.5 min.*

Table I gives phenol coefficients for a number of chemical substances. This table is interesting in its comparison of the bactericidal values for substances of common use, such as hydrogen peroxide, mercurochrome, formaldehyde, lysol, hexyl resorcinol (ST 37), mercuric chloride, organic mercury compounds, and so forth.

Cresol or lysol solutions are not much better than phenol (otherwise known as carbolic acid). Formaldehyde is comparatively poorer as a disinfectant. Many other organic antiseptics that might be used are not readily available, or are costly, or would attack the plastic eyepieces of certain masks. The organic mercury compounds compared to other chemicals in solution possess high bactericidal effect. They may be contemplated for use. There seems to be a general antipathy to use of mercury compounds because historically considered, deaths have resulted from people internally taking corrosive sublimate (mercuric chloride) rather than calomel (mercurous chloride). Caution must be exercised in properly labeling any poisonous disinfectant material and because mercury compounds are most poisonous to man as well as to bacterial organisms we do not have reason for discarding them for use. All disinfectants are harmful if taken internally.

Recommends Mercuric Chloride

Mercuric chloride solutions have marked merit for disinfection. Mercuric chloride is a water soluble solid that can be packed in capsules for ultimate dilution to some desired strength solution. It is readily available, and comparatively cheap when one considers the very dilute solutions which are bactericidal. A recent research thesis of Kruse [1], Caldwell, and Bollen, reports on many experiments on comparative bactericidal effect and disinfection times of various metal salt solutions. Escherichia coli, a typhoid type organism, and Pseudomonas fluerescens typical of some common water contaminants, were used. Many factors must be considered in such a study such as the number of bacterial organisms per milliliter of solution, organic matter present in solution, temperature, time, and concentration of metal containing salt in the solution. Mercury, silver, and copper salts are among the most toxic to the organisms studied. Table II summarizes some results on disinfection times by mercury and silver salts in solution containing about 6,760,000 bacterial cells per milliliter. The death rate of the organisms in the concentrations studied is proportional to a little more than the square of the metal ion concentration.

Physicians use a 1:1000 solution of mercuric chloride in sterilizing rubber gloves and in the washing of instruments. It is not uncommon for laboratory technicians to allow metal instruments to stand in this dilute mercuric chloride solution for some hours. Solutions of mercuric chloride of as low as one part per million of mercury have been shown to quickly kill bacteria. It is suggested that a solution about 100 times this strength be used to sterilize the facepieces of gas masks, which should certainly insure bacterial kill. This solution could be made by dissolving 0.135 grams of mercuric chloride in a liter of water or 0.0045 ounces of mercuric

(1)H.W. Kruse; Masters degree thesis, Oregon State College under direction of Dr. W.E. Caldwell and Dr. W.B. Bollen.

chloride per quart. Such a solution would be strongly disinfecting, cheap, and noncorrosive. The normal procedure for gas mask disinfection could be followed. A water wash of the gas mask facepiece should always follow use of any disinfecting solution. Because of the water solubility of mercuric chloride it can be readily washed free of the mask.

TABLE II

DISINFECTION TIMES BY MERCURY AND SILVER IONS

Metal Ion	Concentration in Parts Per Million	Disinfection Time
Mercury ion	4 p.p.m.	0-1 min.
" "	2 "	5-6 "
" "	1 "	10-15 "
" "	0.5 "	20-25 "
" "	0.2 "	40-45 "
Silver ion	4 "	1-2 "
" "	2 "	6-7 "
" "	1 "	15-20 "
" "	0.5 "	55-60 "
" "	0.2 "	90-120 "
Copper ion	2.0 "	45-60 "

Copper Sulfate Highly Effective

Silver salts are expensive and water solutions of them stain fabric and are not suggested for use on gas mask facepiece disinfection. The bactericidal value of copper sulfate (blue stone or blue vitriol) is not to be overlooked. Solutions containing as little as ten parts copper ion per million are toxic to bacteria. Copper salt solutions are noted for use in killing fungus or algae. A solution of one part copper ion to a thousand of water has marked disinfecting quality and is too dilute to be appreciably corrosive on the fabric or metal of gas masks. After a short disinfection time it is readily washed from a mask. Since a 3% copper sulfate solution is used and available for treatment of white phosphorus burns it is suggested that the solution could be diluted 5 times to prepare a solution suitable for gas mask facepiece sterilization. A 0.6% copper sulfate solution is recommended.

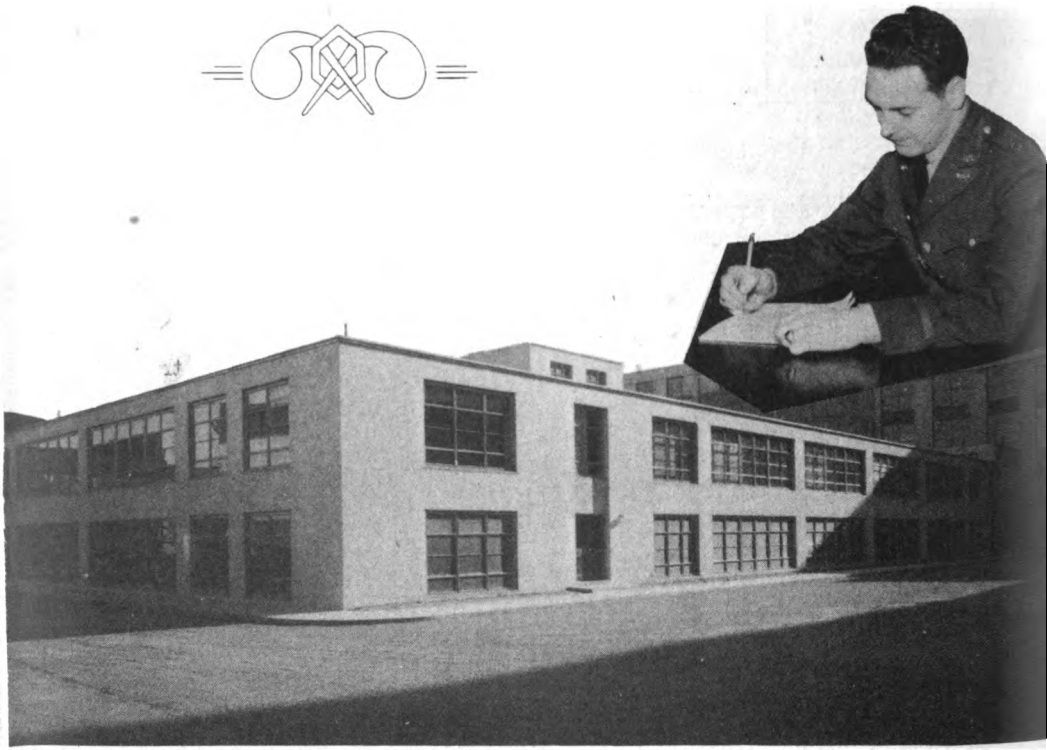
Certain naval officers have found a 30-50% alcohol-in-water solution fairly satisfactory in disinfecting gas masks that had to be turned in by one group of men and used not long thereafter by another group. The alcohol-water solution quickly evaporates after the mask is cleaned.

Any perspiration or other organic matter that contaminates a gas mask facepiece will somewhat interfere with disinfection by any chemical solution. Cleaning of the facepiece with hot soapy water may well precede use of a disinfecting solution. In fact washing with hot laundry soap solution will do much to remove or kill bacteria and minimize need of a disinfecting solution.

NEW DEVELOPMENT LABORATORY OPENS

C.W.S. Technical Divisions steps out With Complete Research Lab At M. I. T.

By
J. H. Rothschild, Captain, C.W.S.
Officer in Charge



Early in 1941, it was decided that there was a need in the Chemical Warfare Service, at least during the emergency, for expansion of the facilities of The Technical Division of the Chemical Warfare Service.

Several locations for the laboratory were considered, but the final selection was at the Massachusetts Institute of Technology at Cambridge, Mass. There were several reasons for this selection, but the primary one was the excellent staff of the chemical engineering department, which would be conveniently available for consultation.

A contract was drawn up between the Chemical Warfare Service and the Massachusetts Institute of Technology on May 31, 1941, according to the terms of which the Institute agreed to build a laboratory for the use of the Chemical Warfare Service and also place at their disposal the facilities of the Institute and the consulting services of its faculty. After the emergency, it was understood that the Chemical Warfare would turn the building back to M.I.T. for the use of its chemical engineering department, which has for some years been very much in need of increased space and modern laboratory facilities.

The contract for the construction of the laboratory was awarded to the well-known Boston firm of contractors, McGreery and Theriault, while Coolidge and Carlson, also of Boston, were retained as architects.

The location decided upon for the building was the land back and to the north of the main educational building of the Institute. It was planned that the new structure should be connected to Building 4 of the Institute by a corridor. Because of its location, the exterior finish was to be of buff brick to match the surrounding buildings.

Floor Space Covers 50,000 Square Feet

Work on the new building progressed very rapidly, thanks in part to an A-1-c priority, and the completed structure is an excellently equipped two story building with a floor space of 50,000 square feet. The outside dimensions of the building are 200 feet by 125 feet. As may be seen from the accompanying photograph, large areas of skylight provide quantities of daylight for inside illumination of the building.

The center portion of the new building consists of a large industrial engineering laboratory extending the full two stories so that comparatively large pieces of apparatus may be accommodated. Around this central laboratory, in the basement, are located three smaller industrial chemistry laboratories, one of which is shown in the accompanying picture. Storerooms, a machine shop, dark room, and various other shops complete the basement.

On the first floor of the building are located two large laboratories, one of which, as shown in the accompanying photograph, is used as a testing laboratory, while the other is being utilized as a large research laboratory. Opening into the latter are a balance room and an optical laboratory. There are several small research laboratories suitable for about three men, and four class rooms, on this floor. The latter will be used as conference rooms and additional office space if needed.

There are thirty well-lighted offices decorated in various pastel shades. The Officer-in-Charge, Capt. J. H. Rothschild, occupies an office in the north-western corner of the building and adjacent to this to the east is the

office of the Executive Officer, Capt. W. J. Slagle. Space has also been provided on this floor for a library and reading room.

On top of the building is located a penthouse, in which is housed a well-equipped laboratory where experiments of a possible explosive nature may be carried out without endangering any more of the building personnel than necessary.

Building Can Accommodate Force of 200

Starting on June 1st in temporary quarters provided by the Institute, with a staff consisting of four army officers, and two stenographers, the Chemical Warfare Service Development Laboratory staff has now grown around this nucleus to a force of over thirty, which includes an Officer in Charge, twenty additional officers, six civil service employees, and nine technicians employed by the Institute and assigned to full time work in the laboratory under the terms of the contract. The building can easily accommodate a force of 200 without too great crowding, and with the present emergency, it does not seem impossible that this may come to pass.

The office force occupied the new building on November first, and the remainder of the personnel moved in as fast as the laboratories were completed. There are still a few installations which are incomplete, including the motor generator set and air compressor, due to preferential defense orders, but the building was officially opened or possibly one should more accurately say closed, at a house warming held December eleventh.

Brig. Gen. Ray L. Avery, Commanding General of Edgewood Arsenal, attended the house-warming as the personal representative of Maj. Gen. William N. Porter, Chief of the Chemical Warfare Service, who had expected to attend, but due to the war, was unable to leave Washington. Col. Maurice C. Barker, Chief of the Technical Service, Chemical Warfare Service, who is largely responsible for the existence of the laboratory, was present. Dr. Karl T. Compton, President of M.I.T., and Professor Walter G. Whitman, head of the Chemical Engineering Department, without whose able assistance this building would have been impossible, represented the Institute at the gathering. Short talks were made by General Avery, President Compton, and Captain Rothschild. After these talks, about one hundred specially invited guests including both army personnel and members of the Institute Staff, made a tour of inspection of the building and were then served light refreshments. The building will be closed to the public for the duration of the War.

Competence

We have to have men trained and ready to do the job. There are some things which we of the Army must do ... we must have competent officers, for you know how demoralizing it is to be commanded by someone who does not know his business. We must have intelligent and modern training methods, and we must get rid of incompetent officers from generals to corporals without fear or favor. But we don't accomplish all this over night any more than one can make guns overnight. The human factor takes time to build as well as the material.--Hon. John J. McCloy, September 19, 1941.

Attending the opening of the New Chemical Warfare Development Laboratory at the Massachusetts Institute of Technology, Cambridge, Mass., were (left to right above), Prof. Walter G. Whitman, Head of the Department of Chemical Engineering, M.I.T.; Dr. Karl T. Compton, President, M.I.T.; Capt. J. H. Rothschild, Officer in Charge of the Laboratory; Brig. Gen. Ray L. Avery, Commanding General, Edgewood Arsenal; and Col. Maurice E. Barker, Chief Technical Service, Office of the Chief. Below is a view of the Testing Laboratory in the new building.

EXHIBIT TRAINS ATTRACT THOUSANDS

Tour of 79 Cities Brings in over 4000 Inquiries for Chemical Warfare Equipment

By Capt. Harrison S. Markham, Industrial Service Division, Office of the Chief.

The three Red, White, and Blue Special Defense Trains of the Office of Production Management have returned to Washington, after a six-weeks tour of the entire country, with stops in 79 cities.

Officers of the Chemical Warfare Service who accompanied the trains in an advisory capacity were: Train No. 1 (Eastern United States), 2d Lt. Charles C. Cameron, Personnel Division, Office of the Chief, and 2d Lt. Mason E. Downing, Replacement Training Center, Edgewood Arseanl; Train No. 2 (Mid Western States), 2d Lt. David F. Snowberger, Replacement Training Center, Edgewood Arsenal, and 2d Lt. Philip W. Heuman, Replacement Training Center,Edgewood Arsenal;Train No. 3 (West Coast), Capt. Harrison S. Markham, Industrial Division, Office of the Chief, and Capt. Donald G. Grothaus, Pine Bluff Arsenal.

The Chemical Warfare Service Exhibit, identical on each train, was outstanding among the displays of the Supply Arms and Services,and proved of unusual interest to potential manufacturers. These exhibits were prepared by the Technical and Arsenal Operations Divisions, Edgewood Arsenal.

Letters Flood Office of the Chief

Letters from manufacturers who visited the trains continue to pour in to the Office of the Chief, Chemical Warfare Service and the Chemical Warfare Procurement Districts. It has been estimated that over thirty thousand items of current government procurement were on display in each train. A total of 52,867 individuals representing 26,687 companies were interviewed by consultants of the Office of Production Management. Of this number, 4,019 companies expressed the ability and desire to manufacture one or more items in the Chemical Warfare exhibit.

The project was conceived and executed by the Division of Contract Distribution, Office of Production Management, with the cooperation of the Army, Navy, and Maritime Commission.

Its purpose was to place before the small manufacturers various items

of the Defense Program and to render advice and assistance towards the gaining of contracts. The trains have been pronounced a distinct success. Many production bottlenecks were broken and thousands of business men have seen at first hand that preparation and production for modern war is no overnight task.

The Defense Special Train was crowded with representatives of manufacturing concerns everywhere it stopped. At the right a group of interested manufacturers are shown eyeing pieces of equipment which might be produced in their own plants, and below, 2d Lt. Mason E. Downing is shown explaining the exhibit and answering questions asked by the manufacturers.

Recent Books on Air Raids

"Aircraft Recognition," By R. A. Saville-Sneath. This is a must book for air raid wardens, aircraft spotters, and all others whose duties require them to look aloft. Complete description of German, and British and American ships used by the RAF together with silhouettes and pictures. Over one million already sold in Great Britain! Order them by the dozen. Price $.25.

"Civil Air Defense," By Col. A. M. Prentiss. The complete and up-to-date solution to the many technical problems pertaining to shelters and other means of protection. Detailed discussions of high explosives, incendiaries, gases, and protection for the home and industrial establishment. Fully illustrated. Price $2.75.

"Blackouts." The official data from the Office of Civil Defense. Prepared by the War Department with the assistance and advice of other Federal agencies. Price $.25.

"Air Raid Precautions." The British guide to the air raid problem. Very complete and includes chapters on rescue parties, clearing of debris, structural defense, and care and custody of equipment, in addition to many other items. Illustrated. Price $3.00.

"Chemical Warfare," By Curt Wachtel. The chemicals used in war with a discussion of treatment and protection. Price $4.00.

"Protective Construction." Official data by Office of Civil Defense. Price $.25.

"State and Local Fire Defense." Official data by Office of Civil Defense. Price $.10.

"The Nature of Modern Warfare," By Capt. Cyril Falls. The leading British military critic analyzes modern war. Price $1.25.

Book Review

NEW INFANTRY DRILL REGULATIONS, United States Army, Harrisburg, Pa.: The Military Service Publishing Company 1941.

"The most complete, up-to-date, and comprehensive training guide I have ever seen. A most handy reference for the young officer." - Lt. Col. C. S. Shadle, C. W. S.

This new manual, up-to-date as of September 1, 1941, contains, in addition to drill regulations, the latest instructions in Rifle Marksmanship, Military Courtesy and Discipline, Interior Guard Duty, and the Infantry Pack and Equipment.

MICKEY MOUSE JOINS THE ARMY

Walt Disney visited the Office of the Chief of the Chemical Warfare Service recently to discuss plans for the manufacture of Mickey Mouse gas masks. Above, he is seen showing one of the preliminary sketches to General Porter and Colonel Fisher and below is a group picture of Walt Disney and officers who discussed various phases of the program, namely, (left to right) Colonel Fisher, Colonel Barker, Walt Disney, General Porter and Colonel English. Mickey Mouse gas masks, more or less similar to the one pictured on the right, may be manufactured to encourage children to carry them at all times.