CHEMICAL WARFARE

A Magazine devoted to the activities of the
CHEMICAL WARFARE SERVICE

Of Interest To All Arms

Published Once a Month by the Chemical Warfare School at Headquarters Edgewood Arsenal . Edgewood, Md.

VOL. 11 NOVEMBER 15, 1925 NO. 11

Edited By STAFF, CHEMICAL WARFARE SCHOOL

SOME INTERESTING RESERVE CORPS FIGURES.

Some interesting figures, reflecting the breadth of interest in Chemical Warfare are found in a study of the mailing list of this Magazine. The 952 reserve officers of the Chemical Warfare Service listed, are distributed throughout the Nation, every state of the union being represented except Idaho and Nevado. Roughly, the distribution by states conforms to the distribution of population. New York leads with 121 Reserve Officers including all grades from Colonel to 2nd Lieutenant. Illinois is second, with 96; Massachusetts and Pennsylvania both have 68, while California is next with 61.

While these figures alone are noteworthy, a study of them in connection with the records of attendance at the Chemical Warfare School at Edgewood Arsenal, reveals a story of striking significance. For, of the 47 states represented, including the District of Columbia, no less than 33 have furnished students in courses for reserve officers conducted at Edgewood Arsenal. Far off California is represented by 1 reserve officer among the graduates of the School, while North and South Dakota and Oklahoma have furnished 1 each. Illinois has furnished 14 graduates from its total of 96 chemical warfare reserve officers, more than 14%, the highest total and highest percentage of any state. Thirteen students have come from New York; 9 from Pennsylvania; 8 from Massachusetts and 7 from Wisconsin. A number of states have furnished two or more, while 16 states have furnished one student each.

In all, 112 reserve officers have attended the School or 11.6% of the total listed, as shown in the figures of this office. With the exception of the grade of Colonel, the attendance has averaged about 10% of the total number in each grade.

Allowing for the fact that it is now 7 years, almost to the day, since hostilities ceased on the battlefront in France, that it is only about 5 years that the Chemical Warfare School has been in existence at Edgewood, such proof of a widespread interest in chemical warfare as disclosed by these figures, is a matter of no little import in any consideration of our national defense and military policy.

The following tabulation shows in detail the result of this study:

RESERVE OFFICERS OF THE CHEMICAL WARFARE SERVICE

State	Grouped by States							Graduates of School						
	Col.	Lt.Col	Maj.	Cap.	1st Lt	2nd Lt	Total	Col.	Lt.Col	Maj.	Cap.	1st Lt	2nd Lt	Total
New York	2	9	21	25	25	39	121			2		3	8	13
Illinois	1	8	14	19	22	31	96		2	1	2	5	4	14
Massachusetts		3	7	23	16	19	68				5	2	1	8
Pennsylvania	2	3	4	11	25	24	68			1	2	3	3	9
California		1	5	22	18	15	61			1				1
Wisconsin			8	12	15	23	58			2	2	2	1	7
Ohio		1	7	12	13	13	46				1	1	2	4
Dist.of Columbia	1	3	7	18	3	12	44				4	1	5	10
Maryland		1	10	13	5	12	41				1		4	5
New Jersey		2	4	10	7	9	32		1	1	2		1	5
Colorado			1	4	4	12	21							
Florida			5	7	2	5	19				3		1	4
Indiana			3	7	3	3	16			1	1			2
Texas		1	2	5	1	7	16					1		1
Iowa			2	2	6	5	15					1		1

RESERVE OFFICERS OF THE CHEMICAL WARFARE SERVICE (CONTINUED)

Grouped by States								Graduates of School						
State	Col.	Lt.Col	Maj.	Cap.	1st Lt	2nd Lt	Total	Col.	Lt.Col	Maj.	Cap.	1st Lt	2nd Lt	Total
Michigan		1	2	5	3	4	15		1			1		2
Oklahoma			4		2	8	14			1				1
Alabama			1	1	1	11	14					1	1	2
North Carolina				1	4	8	13						1	1
Georgia			1	5	3	4	13					2	1	3
Connecticut		1	1	4	4	2	12					1		1
Minnesota				5	3	3	11							
Missouri			1	3	4	3	11							
Virginia			1	2	3	5	11				1	1	1	3
Washington			1		8	1	10					1		1
Kansas				1	4	3	8							
Tennessee			2	2	1	3	8							
Nebraska		1	1	2	1	3	8							
Louisiana				1	2	5	8						1	1
Arizona			1	3	1	2	7							

RESERVE OFFICERS OF THE CHEMICAL WARFARE SERVICE (CONTINUED)

	Grouped by States							Graduates of School						
State	Col.	Lt.Col	Maj.	Cap.	1st Lt	2nd Lt	Total	Col.	Lt.Col	Maj.	Cap.	1st Lt	2nd Lt	Total
Maine			1	2	2	1	6							
Oregon			2	1	2	1	6							
South Carolina		1	1	3	1		6		1	1				2
Delaware				2		4	6							
Arkansas				2	4		6				1			1
West Virginia			1	3	1	1	6			1				1
New Hampshire		1	1			3	5			1				1
Mississippi			1		1	3	5						3	3
Vermont			1		2	1	4					1		1
Rhode Island				2	1	1	4					1		1
New Mexico					1	3	4							
Wyoming					1	1	2							
South Dakota					1	1	2						1	1
Montana				2			2							
Kentucky					1		1					1		1

RESERVE OFFICERS OF THE CHEMICAL WARFARE SERVICE (CONTINUED)

Grouped by States								Graduates of School						
State	Col.	Lt.Col	Maj.	Cap.	1st Lt	2nd Lt	Total	Col.	Lt.Col	Maj.	Cap.	1st Lt	2nd Lt	Total
Utah				1			1							
North Dakota					1		1					1		1
Total by Grade	6	37	124	243	224	318	952		5	13	25	30	39	112

RECAPITULATION

Grade	No.	Attended School	Per Cent Attended School
Colonels	6	0	0.0
Lt. Cols	37	5	13.5
Majors	124	13	10.4
Captains	243	25	10.2
1st Lieuts	224	30	13.3
2nd Lieuts	318	39	12.2
Total	952	112	11.7

CHEMICAL WARFARE AND ITS VALUE TO THE ARMY IN MODERN WARFARE.

By Maj. Gen. E. M. Lewis, Commanding Hawaiian Department.

Editor's Note: Recently the Editor wrote to the various Corps Area Commanders asking them for an expression of their views on the value of chemical warfare to an army in modern war. Some interesting replies have already been received and these will be printed from time to time. The following comments are from Major E. M. Lewis, Hawaiian Department.

The use of gas in modern warfare may, broadly speaking, be divided into three parts. The first is the employment of death-dealing or lethal gases which have for their purpose the destruction of the enemy. The second is the use of non-lethal gases, such as tear gas, which are intended simply to disable the enemy and to render him non-effective as a soldier. The third is the widespread and valuable use of smoke for purposes of deception.

It is not unusual to hear chemical warfare condemned on grounds of inhumanity, but those who condemn it are not apt to dispute its potentialities or its value. While we hope never to be confronted with a situation where the use of lethal gas will be demanded, nevertheless, we must realize that such a contingency is within the realm of possibility. Therefore, we will be wise to continue our research and development work along these lines in order to be able to protect ourselves should occasion demand it.

The non-toxic gases, such as lachrymators and sternutators, are powerful chemical agents each of which has a distinct tactical value in modern warfare. Moreover, these agents are not injurious to life, limb or health of either combatant or non-combatant.

Two of the most important factors in modern warfare are deception and concealment. If a commander can deceive the enemy as to his real intentions or can conceal the concentrations, movements, and dispositions of his troops, he possesses a tremendous advantage. In such work chemical warfare agents have proved to be of the greatest importance. The value of smoke as a screen for troop movements, as camouflage for artillery positions, as a decoy to draw enemy fire and as a bar to enemy aerial observation is too obvious to require comment. Next to darkness it is the most valuable agency of concealment known to modern warfare.

I fully agree with the statement attributed to Admiral C. C. Block, U.S.N., that "The United States undoubtedly would surrender a material advantage in renouncing gas warfare".

RUSSIA WILL TEACH CHEMICAL WARFARE.

From Washington Herald, Sept. 16, 1925.

Moscow, Sept. 15. - Chemical warfare courses will be introduced in all the higher schools of Moscow this Autumn. In each chemical faculty will be established a special section for the training of military chemists.

Among the subjects studied will be poison gas, anti-gas substances, and explosives. The course will extend over one year. Only graduates of chemical faculties or students with corresponding preparation will be admitted.

SMOKE AS AN AID TO INFANTRY.

Some Notes on Recent Firing Tests Conducted at the Chemical Warfare School.

By John C. MacArthur, 1st Lieut., C.W.S. (Inf.)

From time to time the Chemical Warfare School has been obtaining data on the practical value of the use of smoke in connection with rifle fire.

The work of each Line and Staff class at the School includes a rifle range demonstration in which the students fire the service rifle on a known-distance range. Three conditions are imposed in these tests - first, fire without hindrance of any nature, second - fire with a smoke cloud laid down over the firing line, and third - fire with a smoke screen laid immediately in front of the targets.

These tests have demonstrated the fact that only random hits may be expected when smoke is laid on the firing line, so as to make rifle fire under such conditions well-nigh negligible, and second, that when smoke is laid on the target the fire efficiency while much impaired is still considerably greater than when smoke is laid on the firing line.

Now it may be said that these results are obvious ones. Nevertheless the tests have served to drive home to all who have participated in them the paramount value of smoke as an aid or hindrance in the fire fight of Infantry, depending on how and by which side it is applied. For the conclusions universally drawn from these tests is that if smoke is laid down on an enemy line, Infantry can advance against the enemy with comparatively few losses from rifle fire, it being practically negligible as long as the smoke lasts. On the other hand the necessity for increasing our fire on part of our line in order to enable another part to advance would seem to be reduced if not entirely removed by such use of smoke, thus resulting also in a saving of ammunition. Again, it has been argued by some that smoke, if laid across a comparatively obscure enemy trench line, will serve to further increase our own fire efficiency by making such a target more distinct; the point being that a line of smoke is a better target than no target at all. Perhaps a field test on a somewhat extensive scale would be required to settle this last question. It is also true that the tests conducted at the Chemical Warfare School would have been of much more value had they been carried on with a considerably greater number of rifles in the line of fire. However, as more and more tests are conducted and the data from same recorded, some definite figures on the fire efficiency of riflemen in smoke may be expected.

Still another point which these tests have served to emphasize is that of the value of machine guns in defense of a position which the enemy has smothered with smoke in order to facilitate an advance upon it. Such use of smoke it would seem would thus add another important point to the already high score of the machine gun as a defensive weapon. However, the principle of the value of smoke on the target in reducing enemy fire effectiveness is in no way affected. While the machine gun may be clamped and indirect fire methods used, it is still true that best results are obtained from it by direct fire with good observation. Although it might be possible to so plot the field of fire in front of a defensive position so as to

probably cover advancing Infantry by indirect machine gun fire, such a project would involve many complications. Hence it would seem that even with machine guns appreciable results may be expected only when the advancing Infantry reaches the "final protective lines" on which the enemy guns will ultimately lay.

While at the present time no authoritative figures on such use of smoke are at hand, those so far obtained in the School tests are both of interest and value.

The firing tests this year were conducted on the A-range at Edgewood Arsenal on the afternoon of October 27th. The smoke screens were obtained by setting out a row of smoke candles in rear of the firing point in one case and in front of the targets in the other. With a fish-tail wind blowing it was difficult to place the limited number of candles used so as to cover the entire firing line. Eight firing points were used at a time. Sixteen students representing all grades of rifle shots conducted the tests, eight completing the series of shoots before the other eight commenced their firing. The method of igniting the candles was one frequently used at the School for demonstration purposes. The candles were laid out about two yards apart and wired together with an electric squib stuck into the top of each candle. The wires were then connected with an exploder box and the whole line of candles set off at once. This has proved a highly effective means of laying a smoke screen for demonstration purposes.

In the tests this year, had more candles been used, the results obtained would have been more striking. As it happened some of the firers on the flanks of the line were for a time outside the cloud and had an unobstructed view of the targets. Again when the smoke was laid across the face of the targets some of those on the flanks were not entirely obscured.

The following table compares the results of this year's test with a test by one of the classes last year, only hits on the silhouette figure being considered. Five rounds slow fire were fired by each participant under each condition. The range was 300 yards and the "D" target was used. Each firer was given two sighting shots in order to adjust his rifle.

RESULTS OF RIFLE FIRE - WITH AND WITHOUT SMOKE.

	Hits on Silhouette Figure - "D" Target.		
	Condition 1 Without Smoke	Condition 2 Smoke on Firing Point	Condition 3 Smoke on Target
1924- 15 Men Firing	22	1	8
1925- 16 Men Firing	32	4	9
Total	54	5	17
Per Cent of Total Hits Without Smoke	100%	9%	31%

Taking the total number of hits on the silhouette figure obtained without smoke as a basis, it will be seen from the foregoing tabulation that-

a. The placing of smoke on the firing line reduced the fire efficiency by 91 per cent.

b. The placing of smoke on the target reduced the fire efficiency by 69 per cent.

Figures for hits on the full face of the targets lead to similar conclusions, the degree of loss in fire efficiency being somewhat less.

It will be seen from a comparison of the results of the test in 1924 and that in 1925 that the case for smoke is more forcibly demonstrated in the former. This is due to the fact that in the firing this year the smoke was not perfectly laid down. However, it serves to emphasize certain salient points to be observed in the laying of smoke screens. Whether the smoke is to be put down by artillery, projectors, mortars or by any other means, sufficient smoke material should be used to completely blind the enemy position. Again if possible, arrangements must be made for observation of the cloud and whenever rifts occur they must be filled in. Advantage must be taken of the wind. In short, to obtain the best results, there is a definite technique in the laying of smoke which must be followed. This involves not only a knowledge of the weapon itself, but knowledge of the effect of weather and wind conditions, observation of the cloud, use of smoke concentration tables and at least something of the chemistry of smoke producing substances.

GOLF COURSE AT EDGEWOOD ARSENAL.

The facilities at Edgewood Arsenal for athletics and recreation now include a nine-hole golf course, the use of which is open to students attending the Chemical Warfare School. The course was started about a year ago. Clay greens were made for temporary use and work was started toward developing grass greens. These have recently been opened for use. The golf club now has about sixty members, consisting of both officers and civilian employees of the Arsenal. Col. C. W. Exton, commanding officer of the Arsenal, is president of the club.

RESERVE OFFICERS EQUITATION CLASS.

Realizing the value to an officer of training in horsemanship, local chapters of the Reserve Officers association in Brooklyn have formed a riding class which meets once a week. Horses are obtained from a Brooklyn riding academy and a Cavalry Officer has volunteered his services as instructor. Second Lieut. J. Mitchell Fain, CW-Res. a member of the class, has written "Chemical Warfare" suggesting similar classes be formed in other cities.

CHEMISTRY IN WAR.

By Captain Maurice Barker, C.W.S.

In the present industrial age it is the practice of corporations to maintain research departments where new processes are worked out, and old methods are revised in the light of modern scientific thought. Time after time in the past decade some quiet laboratory worker has discovered methods and processes which have revolutionized some field of endeavor. Those industries backed by the most successful research departments are usually well ahead of the competition in profits.

As in the industries, so with armies created for National Defense. Every pertinent discovery of science must be used to increase the efficiency of the army in the field. The Congress of the United States has wisely created the Chemical Warfare Service in the United States Army. It has charged this service with research of a chemical and mechanical nature, and with the production of the materials found useful. The supply and training of the army in matters pertaining to chemical warfare are intrusted to this service. This service then stands in the same relation to the United States Army that the research department of an industrial concern bears to that company. In both cases only vigorous research will keep the methods in step with scientific progress.

An industry to be successful must overcome competition. An army in the field, to be successful, must overcome the enemy. Nearly a hundred years ago Von Clausewitz clearly stated the situation as follows: "War therefore is an act of violence; intended to compel our enemy to fulfill our will. Violence arms itself with the inventions of Art and Science in order to contend against Violence. Violence, that is to say, physical force, is therefore the means; the compulsory submission of the enemy is the ultimate object. In order to attain this object fully, the enemy must be disarmed, and disarmament becomes, therefore, the immediate object of hostilities in theory." In order for one country to gain a victory over another Clausewitz says, "The military power must be destroyed, that is, reduced to such a state that it is not able to prosecute the war". Our own doctrine of war taken from paragraph 2, T.R. 10–5 states, "The mission of the army is, therefore, to utilize speedily and effectively the national resources to the extent authorized by Congress, and required by the particular conditions, *and to overcome the will of the enemy by all available means.*"

Having arrived at the conclusion that war is violence, or to quote Sherman, "War is Hell", and going forward with our own theory of war which requires the *use of all available means to overcome the enemy;* where does chemical warfare fit in? We are told that chemical warfare is inhuman; that it has been justly condemned by the general opinion of the civilized world. Suppose we grant that statement. It would apply to all forms of war, and has applied to war from all times. Yet wars have not ceased. Has any form of warfare which proved efficient ever been abandoned? The answer must be; not until

a more efficient method was invented.

Everyone knows that statistics usually can be twisted to support any viewpoint; yet we must always give the records of past events a careful study. The records of the American Army in the World War shows that we had 258,338 men killed or injured in battle during the war. Of those admitted to the hospital, 70,552 were suffering from the action of gas; 153,537 were injured by other means. Gas was fired from artillery and static containers only. Less than fifteen percent of the German shells were filled with gas. In spite of the billions of bullets and millions of H.E. shells, as compared to the hundreds of thousands of gas shells, we had nearly half as many men put in the hospital by gas as by all other means combined. We therefore must admit the high efficiency of gas when used against our own troops. A man put in the hospital is a man disarmed, which is the immediate object of armed conflict.

From the viewpoint of the individual; is it better to be put out by a bullet or piece of explosive shell, or to be gassed? We all love life, therefore we prefer the method which will give us the best chance of complete recovery. Two percent of the men admitted to the hospitals as gas casualties died. Twenty-four percent of those admitted to the hospital by other means died. Of the men gassed, 2.5 per 1000 developed tuberculosis during 1918 and 1919. When all men serving in Europe during the same period are considered, 3.5 per 1000 in 1918,and 4.3 per 1000 in 1919 developed tuberculosis. This indicates that gas has no tendency to cause tuberculosis. At present you see no men blinded or crippled by gas. Only a small percent died, and the others completely recovered. Thus it would appear that gas is much more efficient in getting men into the hospital; yet allowing the individual casualty a better chance to recover in the end. The ideal gas of course is one which would put a man out of action for a period, and would ultimately allow him to completely recover. A gas of this type would be as nearly humane as anything that can be approached in war, and yet would be efficient. The ideal gas is not in sight. Yet mustard is highly efficient in causing hospital casualties for a long period, and most men burned by mustard ultimately recover. One pound of mustard properly applied would put 10,000 men in the hospital. No other material used in war will do this.

If two men were fighting a duel, one armed with a Springfield rifle, and the other with a long bow, we know which would have the advantage. Yet the driving force behind the bullet comes from the chemical action of the burning propellant. The chemical action of the powder drives the shell from the gun; the chemical action of the decomposing bursting charge makes the shell dangerous upon impact. So we see that the elimination of chemical action from warfare would arm all contestants with cold steel, and the slaughter resulting from battles fought with the sword, pike, and lance are truly frightful. Certainly there is nothing uplifting or humanitarian in driving a bayonet thru a man's body.

The misguided folk who howl for the abolition of chemical warfare

are not thinking straight. Why not attack the basic problem and eliminate war? If this is not done there is no hope for the elimination of the most efficient method of waging war. If we denied our own army the use of gas in any major war; it would be like arming our men with bows to fight an enemy armed with rifles. Not *our will*, but theirs would prevail.

We have heard much of the airplane flying over a city, dropping a few bombs, and wiping out the population. The population could be wiped out if enough gas were dropped. With mustard, 100 to 200 pounds for each area 100 yards square would be required over a large area; then not deaths, but hospital cases would be expected. If the idea was to kill the inhabitants 300 to 400 pounds for the same area would be required. If each bomber carried 1000 pounds his plane load would only cover a place 200 x 300 yards at the most. Hence it is easy to see the large number of planes required to attack a city of any size. The chief danger would be the panic, and not the gas. We are all afraid of the unknown.

The representatives at the Geneva Conference put thru a protocol dealing with gas warfare. That protocol reads as follows:

PROTOCOL

"THE UNDERSIGNED PLENIPOTENTIARIES, in the name of their respective Governments:

WHEREAS the use in war of asphyxiating, poisonous, or other gases, and of all analogous liquids, materials, or devices, has justly been condemned by the general opinion of the civilized world; and

Whereas the prohibition of such use has been declared in Treaties to which the majority of Powers of the world are parties; and

To the end that this prohibition shall be universally accepted as a part of international law, binding alike the conscience and the practice of nations.

DECLARE:

That the High Contracting Parties, so far as they are not already parties to Treaties prohibiting such use, accept this prohibition, agree to extend this prohibition to the use of bacteriological methods of warfare, and agree to be bound as between themselves according to the terms of this declaration.

The High Contracting Parties will exert every effort to induce other States to adhere to the present Protocol. Such adhesion will be notified to the Government of the French Republic, and by the latter to all signatory and adhering Powers, and will take effect on the date of the notification by the Government of the French Republic.

The present Protocol, of which the French and English texts are both authentic, shall be ratified as soon as possible. It shall bear today's date.

The ratifications of the present Protocol shall be addressed to the Government of the French Republic, which will at once notify the deposit of such ratification to each of the signatory and adhering Powers.

The instruments of ratification of and adhesion to the present Protocol will remain deposited in the archives of the Government of the French Republic.

The present Protocol will come into force for each signatory Power as from the date of deposit of its ratification, and from that moment, each Power will be bound as regards other Powers which have already deposited their ratifications."

Should the Senate of the United States ratify this Treaty we would be honor bound to abide by it. We would thus handicap ourselves by refusing to use a weapon found efficient in war. We would place our army in the position of the corporation which refused to make use of useful results obtained by its research division.

C. W. S. CORRESPONDENCE COURSES.

Of eighteen branches, staff corps and departments of the Service conducting correspondence courses during the year 1924-1925, the Chemical Warfare Service stood fourth in the percentage of those enrolled who completed sub-courses. The figure for the C.W.S. was 32.2%, the highest being Military Police 50%, however, only 2 students completed sub-courses in the latter subject. The distribution of students in C.W.S. courses in Corps Areas was as follows:

1st Corps Area	6
2nd Corps Area	19
3rd Corps Area	14
4th Corps Area	9
5th Corps Area	2
6th Corps Area	22
7th Corps Area	4
8th Corps Area	17
9th Corps Area	11
Total	104

FIGHT GAS WITH GAS.

Extract from La Croix - Paris. September 26, 1925.

Near Halle a German factory of chemical products has succeeded in dissociating by catalysis all the war gases now known and in finding for several of them a "counter-gas" containing a chemical capable of neutralizing the noxious component of the gas. These factories are now studying a practical means for producing these anti-gas chemicals in large quantities and dispersing them quickly over ground shelled by the enemy with gas, either from mobile reservoirs immediately transported to the place, or by system of subterranean canals and pumps with a central control so that an entire town may be flooded with the neutralizing gas to immediately overcome the effect of the enemy's gas. According to their habit, the Germans make a great noise about their discoveries. We are more discreet.

A SOUTH AFRICAN VIEW OF CHEMICAL WARFARE.

From Natal Advertiser, Durban, S. A.

POISON-GAS.

There was considerable surprise at the recent Arms Traffic Conference at Geneva when the German delegate, going outside the agenda, declared that Germany was ready to participate in any international conference agreement for the complete suppression of warfare by chemicals or poison-gas. Thus the first nation to resort to poison-gas warfare is the first to announce its willingness to ban the future use of the deadly stuff. It may also be noted that during recent years Germany has diminished her output of the equally poisonous vocal gas. At the instigation of the United States, the other delegates expressed their approval of such a conference, but, so far, nothing has been done to summon an executive assembly. Germany has the equipment for the manufacture of poison-gas to a greater extent than any of her neighbors. There seems no reason to doubt the sincerity of Germany in coming to the conclusion that prohibitive rules should be enforced. She suffered less from the war on her own soil than the Allies did. But were another war to break out during the present generation she would not be so secure. Retaliation would be inevitable, as was shown when the Allies adopted German methods in self-defence. That is why the time for averting superfluous destruction is the present, while men have a chance of discussing the matter more or less calmly. Certainly Germany has removed the most important obstacle to an understanding. But it may well be doubted whether such understanding may be possible to reach. It seems a delusion to imagine that a mere paper pledge among those concerned will amount to anything. Some way of enforcing such an agreement by making effective provision for heavy penalties where it is disregarded must be devised before it becomes feasible, and how to do that will be a puzzle. A prudent nation will make virtuous resolutions, but will take care to keep itself in a position where it can protect itself against treachery. Gas was prohibited by international convention before the war, but under stress of circumstances it was used. It is to powerful a weapon to be ignored by a nation which feels its life is at stake. It is the conscientious nation that will be at a disadvantage if an agreement to ban poison-gas should be signed at Geneva. The strongest argument against such a treaty is that it would be broken by the more desperate, or more unscrupulous, combatant.

CHEMICAL WARFARE AT THE CAVALRY SCHOOL.

A course of study for this years session of the Cavalry School, at Ft. Riley, includes lectures on Chemical Warfare. These lectures are scheduled for both the advanced and Troop Officers Course and involve consideration of chemical agents, behavior of gas in the field, use of chemicals by the different branches of the service, means of protection, including use of animal masks. The value of the use of chemical agents in riots and other domestic disturbances, and the various tactical uses of smoke are also involved in this course.

A GAS PROBLEM FOR THE GARRISON SCHOOL.

By John C. MacArthur, 1st Lieut, C.W.S. (Inf.)

Troop training in gas defense is no mere matter of gas mask drill. Every regimental officer should know something of chemical agents, their properties and tactical use, and the means of protecting against them. He should know something of chemical warfare weapons and their limitations. He should know the duties of a regimental and battalion gas officer, for he may be called upon to fill such positions.

It is contemplated that in time of war, organizations will detail from their own personnel officers and non-commissioned officers for the duty of training troops in individual and collective protection against gas. Thus, each regiment would appoint a regimental gas officer and gas non-commissioned officer to supervise this work assisted by a gas officer and gas non-commissioned officer from each battalion. In turn, each company would appoint two non-commissioned officers specially trained in gas defense, to carry on instruction of the men of their company, and also for the purpose of handling and maintenance of protective equipment and appliances.

The duty of these specially selected officers and non-commissioned officers is mainly that of protection against gas, but they also perform the important function of chemical warfare intelligence, since it is upon them that commanders would ultimately depend for reliable information in the field. For instance, if on any particular front it developed that the enemy was using mustard gas on one section of our line and not on another, timely knowledge of this fact and the location of the mustard areas would be of paramount importance. For it is not only logical, it is axiomatic, that he will avoid the mustard area in an attack. This, of course, is assuming that his troops are not provided with mustard proof clothes.

Too often in our peace time training of troops, something unforeseen develops to interfere with the time allotted for training in chemical warfare defense. When such is the case gas defense is generally the loser. No training schedule is ever followed to the letter - indeed such schedules must necessarily be flexible in order to allow for variable weather conditions and for the unexpected demands on personnel which conditions of the service impose.

However, it is not believed that training in gas defense need thereby be neglected. From the standpoint of a company commander, there is always open the "rainy day schedule", part of which time might well be used in instruction of his men along these lines. How many times does it happen that looking out the window of his orderly room, a captain is confronted with the problem of what to do with his men when the weather will not permit the customary out-door drill? It may be that he has provided a definite program for just such a time, but in the writer's experience, as often as not, he faces this problem by turning to his First Sergeant and saying:- "You take them for an hour, Sergeant - give them some instruction in guard".

I do not mean that instruction in guard duty is not important in the training of the soldier, but an hour spent in drafting a rainy day program to include training in gas defense, would not only prove of inestimable value to the service, but might save a company commander many moments of distraction.

From the viewpoint of training of officers, there is always at hand that somewhat indefinite but extensive period which we know as that of the "Garrison School". It is the writer's opinion that in connection with map problems to which such schools are largely devoted, some time might well be given to problems involving the duties of regimental officers in chemical warfare defense. In his experience, no such problems have ever been offered as a part of such a course. This may have been due to the fact that Chemical Warfare, being more or less in its infancy, such problems have not become a part of training literature published to the service at large. But with the ever increasing number of graduates of the Chemical Warfare School, it may well happen some day that a certain gas non-commissioned officer will become as firmly established a character in our tactical studies as is the far-famed "Sergeant Hill".

The training of officers in chemical warfare protection can be made instructive and interesting. Moreover, it will be found that the same basic principles which underlie the study of all tactical operations, apply equally as well to the use of chemicals in war. A map problem involving the duties of the regimental gas officer will develop questions no less perplexing than those customarily encountered in our Garrison Schools. Such problems will necessarily tax each officer's knowledge of chemical warfare agents and tactics, but they will prove of great value in placing the required training upon a concrete and interesting basis.

As a suggestion, the writer has selected from among a series of problems given to students of the Line and Staff Course at the Chemical Warfare School, a sample problem in gas defense for publication herewith. This is a simple problem in three phases, and calls for no more technical knowledge of chemical warfare than is supposed to be possessed by any regimental officer. Being based upon the Gettysburg series of maps, it is available for use in the Garrison Schools of any regiment. It is only a sample of the type of problems that I have in mind - many others might be devised along similar lines. The situations here presented might well be expected by any regiment of infantry should war be suddenly declared.

Experience may be the best teacher, but many lessons of value may be learned by just such problems and many difficulties ironed out. It will be noted that in the last phase of this problem, the situation arises wherein our own front has been partially covered with mustard gas, leaving the possibility of an attack on those sectors which have been harassed by non-persistent agents. Records of the World War offer some pertinent examples of such tactics in the use of chemicals by the Germans. In March 1918 in the drive against the British 3rd and 5th Armies, the Germans laid a ten day artillery preparation over a sector of 120 kilometers, from Arras

to Gobain. In this preparation some 150,000 to 200,000 gas shells were fired including both mustard and non-persistent toxic gas.

A study of this fire and the subsequent attack shows that parts of this entire front were cut off and denied by the use of mustard gas, leaving certain lanes between the mustard areas through which the attack could be made. It was through these areas that the attack was made, the British suffering some 5,000 casualties in the mustard areas alone.

The following is the problem referred to with a solution to each situation.

CHEMICAL WARFARE SCHOOL
EDGEWOOD ARSENAL, MD.
LINE AND STAFF OFFICERS' COURSE

MAP PROBLEM NO. 12 - Series A.

Map Reference - General Map - GETTYSBURG - ANTIETAM, 1" = 10 miles
Topographical Map - GETTYSBURG - ANTIETAM, 1/21120,
ARENDTSVILLE and HUNTERSTOWN Sheets.

GENERAL SITUATION:

MARYLAND and VIRGINIA (Blue) declared war on PENNSYLVANIA (Red) 5 days ago. Both countries are prepared for chemical warfare.

SPECIAL SITUATION NO. 1 (Blue):

Orders have been issued for regular regiments to recruit to war strength with volunteers before moving to division mobilization points. The peace strength organizations are about 60% of the required war strength.

The 1st Blue Infantry is stationed at LEESBURG, VA.

Enlistments indicate it will reach war strength in 10 days.

Officer personnel will not be completed until after the regiment has reached the division mobilization point.

The chemical warfare equipment of the regiments consists of 25 training masks per company, a gas chamber, a few sectionalized grenades, candles, a miniature gas proof shelter entrance, gas samples and a small amount of literature.

You are Lieut. X, Gas Officer of the 1st Blue Infantry.

REQUIRED:

What do you do to prepare your organization for chemical warfare defense up to the time the regiment leaves for the division mobilization point?

A SOLUTION TO SPECIAL SITUATION NO. 1.

Lieut. X arranges at Headquarters, 1st Blue Infantry, to have the Gas Non-commissioned Officers, at least one per company, designated at once. He then requests they be directed to report to him each

afternoon for instruction. He will have them for about 25 to 30 hours before the regiment leaves for the division mobilization point.

In this time he will instruct them in protection and chemical agents, paying particular attention to mask drill, mask fitting and methods, and practice in giving instruction in these subjects.

The selection of battalion gas officers should not be made until all the officers have reported, and no work should be tried with other officers until that regiment has its complement.

With men constantly coming in and with only 25 training masks in each company, he will be unable to do any unit instruction. Non-commissioned Officers will be selected from the trained peace time personnel. He therefore can prepare to carry on training by training his gas Non-commissioned Officers in their duties, particularly those of instruction.

He will also have these Non-commissioned Officers after having learned to fit masks, obtain the sizes of new men. In this way there will be no unnecessary delay in the issue of masks when the regiment reaches the division mobilization point.

SPECIAL SITUATION NO. 2.

The 1st Infantry reported at the division mobilization point at HARPER'S FERRY, where it has been in training for the past four weeks. Gas masks and other protective equipment have been provided for all personnel.

Information from the combat zone is that the Blue forces invaded Red territory, but have been stopped in the vicinity of GETTYSBURG.

Lieut. X attended a meeting called by the C.O. 1st Infantry, where the information was given out that the division would move in 3 days to reinforce the Blue invading force. The movement is to be by marching.

REQUIRED:

(a) The recommendations of Lieut. X as to the movement of protective chemical warfare supplies belonging to the 1st Infantry.

(b) Upon what considerations were the recommendation in(a)based?

A SOLUTION TO SPECIAL SITUATION NO. 2.

(a) Lieut. X recommended the men to carry their masks and that any training supplies and reserve equipment in the possession of the regiment be transported by the Regimental Supply Officer.

(b) The most important reason for carrying the masks is that the troops will be in an area subject to chemical attack upon the end of the march and there will be no opportunity for re-issue. Second, the march is but 4 days duration and the length of the march would not compensate for the time and labor consumed in taking up the masks and in re-issue. This would be true even if no danger existed at the end of the march. Third, in an overland journey it is unlikely there will be any transportation other than unit trains and there would be none therefore to carry masks.

The reserves and equipment in the possession of the regiment would be very small and it would be better to keep it in possession of the Supply Officer than to issue it to organizations.

SPECIAL SITUATION NO. 3:

The 1st Blue Division reached GETTYSBURG on the afternoon of May 25th.

On May 26th, the 1st Blue Infantry had the following information: The Blue forces are holding a line along the south bank of the CONEWAGO, its left about 1800 yards northwest of ARENDTSVILLE. The left division (6th Division) holds a sector the right boundary of which is MUMMASBURG - CLEAR SPRING S.H. The 5th Division is on the right of the 6th Division and holds the line to the bend in the creek 400 yards north of TABLE ROCK S.H. The 4th Division is on the right of the 5th and holds to HERSHEY MILL.

The 1st Division is to relieve the 5th Division on the night of May 27th. The 1st Infantry is to be in the line and will occupy the sector from house at (345.6-759.4) to the crossing at (347.8-759.2), relieving the 20th Infantry.

Lieut. X having learned the above, made arrangements to make a reconnaissance, taking a Gas N.C.O. with him and leaving the night of the 26th in order to be on the ground early the morning of the 27th. He spent that night at Headquarters 5th Division and at 8:00 A.M. the 27th, accompanied by his Gas N.C.O. was at the Regimental Headquarters of the 20th Infantry to be relieved by the 1st Infantry. He held a conference with the Gas Officer of the 20th Infantry and obtained the following information:

The enemy has been using non-persistent gases freely on the area occupied by the regiment. (Lieut. X made a sketch from the gas map showing areas. See accompanying sketch).

The time of fire has been mostly at night.

The methods of projection have been chemical mortars and projectors on the forward areas, and airplane on the rear areas.

He was told yesterday by the D.C.W.O. that mustard gas had been fired by artillery on the 6th Division for the past 2 days.

No dugouts have been completed in the area.

One or two rooms in houses near the Regimental and Bn Headquarters have been made gas proof.

There is a supply of chloride of lime (for use in de-gassing mustard areas) near each Bn Headquarters and near Regimental Headquarters. None had been given to the companies.

No other supplies are on hand.

Prevailing winds are from the northeast.

Lieut. X directed the Gas N.C.O. to look over the shelters and gassed areas in the reserve position and to be back at Regimental Headquarters by 1:00 P.M.

Lieut. X accompanied by the Gas Officer of the 20th Infantry then made a reconnaissance of the forward positions, studied the plans of protection which seemed to cover the situation and returned to Regimental Headquarters.

He learned the reconnaissance party of the C.O. 1st Infantry, had reached there at 10:00 A.M. and had gone forward to make reconnaissance. They were expected to return by 3.00 P.M.

REQUIRED:

What deductions are made by Lieut. X from his reconnaissance?

What report and recommendations would Lieut. X make to the C.O. 1st Infantry?

A SOLUTION TO SPECIAL SITUATION NO. 3.

DEDUCTIONS OF LIEUT. X.

Prevailing winds and terrain are very favorable for chemical attack. A number of ravines offer flues down which gas will go with a northeast wind. These ravines also are the logical place for reserves.

Roads leading into the left of the regimental sector and the MUMMASBURG - RJ 679 road, have several spots that offer good targets for gas.

The object of the enemy chemical operations seems to have been to weaken the Blue forces; 1 by obtaining casualties, 2 by harassing lines of communication and interfering will supply of ammunition and food.

The reported use of mustard on the 6th Division while none has been used on the 5th Division, indicates a possible intention of the Reds to attack on the front held by the 5th Division.

The firing of 300 Stokes Mortar shells in 2 minutes on Target 9, indicates that more than one company of chemical troops were engaged. It is logical to assume then that chemicals will be extensively used to support any attack made.

Inasmuch as the type of chemical attack to be expected is with non-persistent agents, the plan of protection for this type must be first considered. As this plan does not require the evacuation of areas, the distribution of troops to cover the front will remain the same as when no attack is in progress. The plan for persistent types must also be developed, but is not as urgent.

Routes normally followed in making the relief of the left Bn, are subject to gas attack. Alternate routes should be selected.

Supplies and shelters are sufficient to meet immediate needs.

Report & Recommendation of Lieut. X.

Report covers the points in the deducations in a much more concise form.

Recommendations -

Routes of approach be selected toavoid the areas subject to gassing.

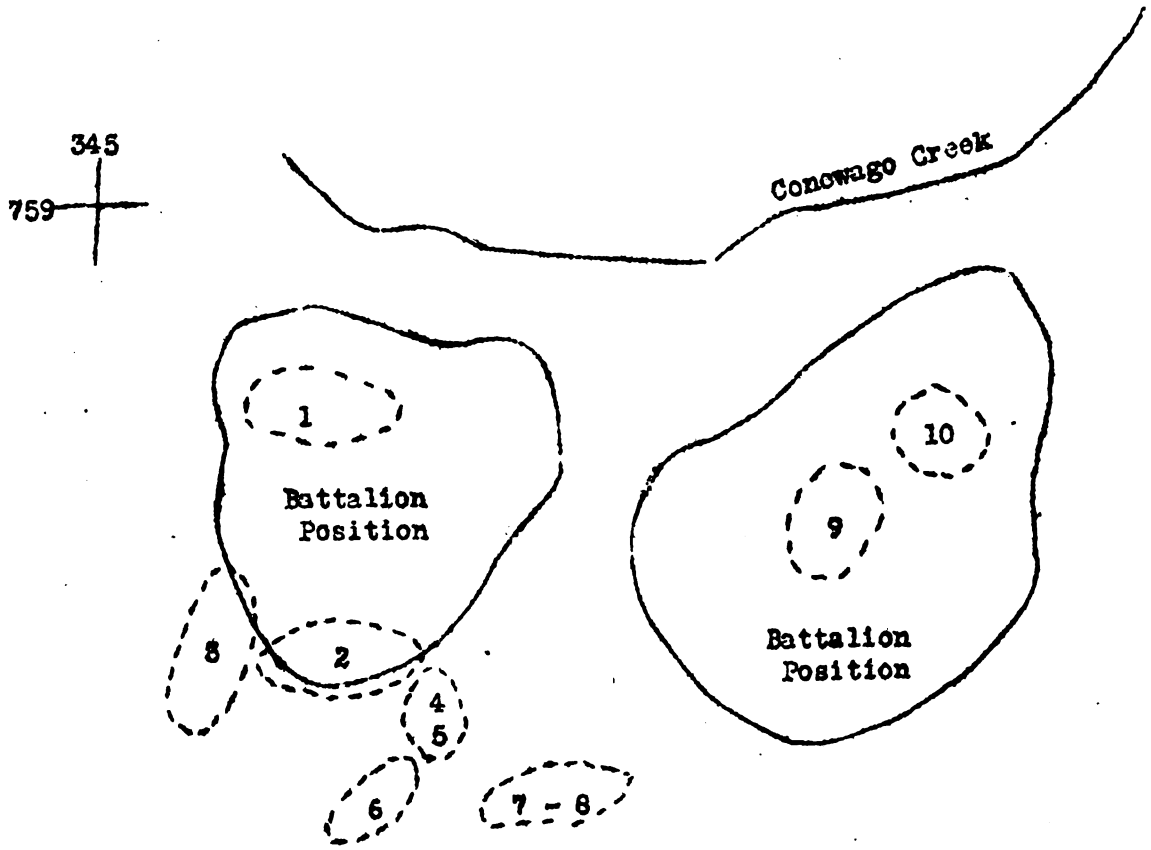
Troops to be warned that gas may be expected any time.

Unit commanders to be warned of the probability of a general attack.

Plan of protection in use by the unit being relieved to be continued in effect for the present.

Units to be informed of areas subject to chemical attack that lie in their area and along their routes of approach.

POSITION DIAGRAM.



1 - 40 Livens CG 2 AM 5/24
2 - 10 - 300 lb. air bombs 1:30AM 5/23
3 - Harassed with CN night of 5/23
4 - Harassed with CN night of 5/24
5 - Harassed with CN&CG night of 5/26
6 - 2 - 300 lb. air bombs CG 1:45 AM 5/23
7 - Harassed with CN night of 5/22
8 - Harassed with CN night of 5/24
9 - About 300 CG-Stokes shell in a 2 min. burst at 2 AM 5/26
10 - 40 Livens CG at 2 AM 5/26
11) 12) 13) - Bombed with CN and CG nights of 24-25-26
14) 15) 16) - Same as 11-12-13
17) 18) - Bombed with CN nights of 24 & 25

Key to Gas Symbols:
CG = Phosgene
CN = Chloracetophenone (Tear gas)

FOURTH NAVY LINE OFFICERS' CLASS.

Orders for the detail of twenty-six Line officers of the United States Navy to attend the Navy Line Officers Course at the Chemical Warfare School, Edgewood Arsenal, Md., scheduled to open November 16th, had been received at the time of going to press. This will be the fourth such course for Naval officers conducted since the Chemical Warfare School was established. It will be of six weeks duration, ending December 24th. The schedule is similar to that of the Line and Staff Course but is especially adapted to the needs of Naval officers in Chemical Warfare.

To date, a total of 150 officers of the Navy have been graduated from the Chemical Warfare School. In addition there are twenty-five officers of the United States Marine Corps listed among the graduates.

The list of students detailed for the forthcoming course consists of three lieutenant commanders, eight lieutenants, four lieutenants, junior grade and eleven ensigns. The list follows:

LIEUT. COMMANDERS

Brown, Walter E.
DeMott, Max B.
Ware, James G.

LIEUTENANTS

Conover, James P.
France, Albert F.
Holman, Glenn S.
Hoover, Gilbert C.
Kell, Eugene L.
Mills, Earle W.
Mills, Leon W.
Williams, Richard O.

LIEUTENANTS (jg)

Freeman, James S.
French, John E.
Fuller, Blair M.
Womble, John P.

ENSIGNS

Brydon, George M.
Crowther, Gilbert R.
Jarrell, Albert E.
Hank, William E.
Keith, Harry H.
Larson, Harold O.
Lee, Charles L.
Nager, Charles J.
Oswald, Adolph H.
Rawlins, Edward W.
Thornton, Reuben T.

CHANGES - CHEMICAL WARFARE OFFICERS' RESERVE CORPS.

NAME AND RANK	ASSIGNMENT JURISDICTION	REMARKS
COLONEL		
Hunt, George A.	9th C.A.	5369 Broadway, Oakland, Cal. Prom. from Lt. Col. 10/24/25.
LT. COLONELS		TA Group.
McNally, William D.	O.C.,CWS	3734 No. Harding Ave., Chicago, Ill. Apptd. 8/10/25; accptd. 9/28/25. BA Group, E.A.
Stone, Lee A.	Unassigned	1329 Thorndale Ave., Chicago,
MAJORS		Trans. from MI-Res 10/28/25.
Baker, Ross A.	O.C.,CWS	Add. chgd. from: Univ. of Maryland, College Park, Md., to 114 Trinity Place, Syracuse, N.Y. BA - Chem. Warfare School, E.A.
Buchanan, Edward F.	O.C.,CWS	11416 Longwood Drive, Chicago, Ill. Apptd. 8/22/25; accptd. 9/9/25. BA, Edgewood Arsenal
Cade, William R.	O.C.,CWS	Add. chgd. from: 3719 S St., N.W., Washington, D.C., to: Lakeland, Fla., 10-12 Strand Bldg. Ba. Edgewood Arsenal.
Hay, Robert	O.C.,CWS	340 Portola St., N.S., Pittsburgh, Pa. Apptd. 8/28/25; accptd. 9/10/25. BA Group, 3rd CWS Proc. Dist.
House, Frank M.	9th C.A.	Add. chgd. from 2156-B Clinton, Alameda, Cal. to: 608 San Miguel, Berkeley, Cal. TA Group.
Schaar, Adolph E.	Unassigned	556 W. Jackson Blvd., Chicago, Ill. Apptd. 10/17/25; accptd. 10/21/25.
Wesson, Lawrence G.	O.C.,CWS	Add. chgd. from: 4013 Ridgewood Ave., Baltimore, Md., to: Vanderbilt School of Medicine, Nashville, Tenn. BA Group, Prod. Div., E.A.
Witten, George W. B.	2nd C.A.	Add. chgd. from: 146 E. 35th St., New York City, to: 123 Lexington Ave., New York City. TA Group.
CAPTAINS		
Battle, James W.	O.C.,CWS	Add. chgd. from: Box 392, West Palm Beach, Fla. to: Box 789, Montgomery, Ala. BA Group, Chem. Div., E.A.
Black, Alvin P.	O C.,CWS	Add. chgd. from: 391 Hyde Park Ave., Boston,Mass., to: 811 No. Virginia Ave., Gainesville, Fla. BA - Chem. Div., E.A.

NAME AND RANK	ASSIGNMENT JURISDICTION	REMARKS
CAPTAINS (Cont'd)		
Harrouff, Earl R.	O.C.,CWS	Add. chgd. from: 11th Floor, A.O.U.W. Bldg., Little Rock, Ark. to: 1016 Title Guaranty Bldg., St. Louis, Mo. BA - Edgewood Arsenal.
Hutchins, Roland B.	O.C.,CWS	88 Fountain St., Haverhill, Mass. Apptd. 9/26/25; accptd. 9/30/25. BA - Edgewood Arsenal.
Loehwing, Walter F.	O.C.,CWS	Add. chgd. from: Johnsville, Cal. to: Box 352, Winters, Cal. BA - Chem. Div., E.A.
Manning, John R.	O.C.,CWS	Add. chgd. from: 1109 A.O.U.W. Bldg., Little Rock, Ark., to: 1016 Title Guaranty Bldg., St. Louis, Mo. BA - Chem. Div., E.A.
Palmer, Charles S.	O.C.,CWS	1115 W. California Ave., Urbana, Ill. Apptd. 7/6/25; accptd. 9/14/25. BA - Edgewood Arsenal.
Pendleton, Robert L.	Phil.Dept.	Los Banos College, La Laguna, P.I. Apptd. 7/21/25; accptd. 9/5/25. TA Group.
Russell, Robert P.	O.C.,CWS	227 White St., Waverly, Mass. Apptd. 9/23/25; accptd. 10/9/25. BA - Edgewood Arsenal.
Straw, Walter A.	O.C.,CWS	227 E. Washington Ave., Wheaton, Ill. Apptd. 10/12/25; accptd. 10/20/25. BA - Edgewood Arsenal.
Sweet, Harold A.	O.C.,CWS	28 Hillcrest Ave., Cranford, N.J. Apptd. 10/2/25; accptd. 10/12/25. BA - Edgewood Arsenal.
Wright, Howard V.	O.C.,CWS	Edgewood Arsenal, Md., Apptd. 8/29/25; accptd. 9/10/25. BA Group, Edgewood Arsenal.
FIRST LIEUTENANTS		
Clough, Lyle A.	Unassigned	1½ Washington St., Auburn, N.Y. Apptd.10/15/25; accptd.10/23/25.
Fritschel, Herbert E.	6th C.A.	Add. chgd. from: 110½ - 34th St., Milwaukee, Wis. to: The Scanlan Laboratories, Madison, Wis. TA Group.
Gullett, Ben H	.O.C.,CWS	Add. chgd. from: 456 So. Sigel St., Decatur, Ill. to: 629 W. Decatur St., Decatur, Ill. BA - School Bn., E.A.
Jackson, Kirby E.	9th C.A.	Add. chgd. from: Athens, Ala. to: 4726 University Way, Seattle, Wash. TA Group.

NAME AND RANK	ASSIGNMENT JURISDICTION	REMARKS
FIRST LIEUTENANTS (Cont'd)		
Lienhardt, Winfield S.	O.C.,CWS	Add. chgd. from: 7 Brownell St., Stapleton, S.I., N.Y., to: 90 Gansevoort Blvd., West New Brighton, N.Y. BA Group - Edgewood Arsenal.
Morris, Vlon	O.C.,CWS	School of Chemistry, Univ. of Minn., Minneapolis, Minn. Prom. from 2nd Lt. 10/23/25. BA - Chem. Div., E.A.
Persing, Kimber M.	O.C.,CWS	Add. chgd. from: 1321 Lakefront Ave., Cleveland, Ohio, to: 3386 Winsford Road, Cleveland,Heights, Ohio. BA - Edgewood Arsenal.
Pryor, Ralph W.	O.C.,CWS	Add. chgd. from: 105 So. Kensington Ave., La Grange, Ill. to: 48 Bluff Ave., La Grange, Ill. BA - Mech. Div., E.A.
Williams, Robert P.D.	O.C.,CWS	219 Park Ave.,Ridgway, Pa. Apptd. 8/26/25; accptd. 9/1/25. BA - Edgewood Arsenal.
Zoole, Leonard	O.C.,CWS	Add. chgd. from: 1428 Frankford Ave., Philadelphia, Pa. to: 359 E. Cambridge St., Phila., Pa. BA - Chem. Div., E.A.
SECOND LIEUTENANTS		
Albright,Judson D.,Jr.	O.C.,CWS	Add. chgd. from: Room 544, Old Post Office Bldg., New York City, to: P.O. Box 953, Charlotte,N.C. BA - Prod. Div., E.A.
Brigham, Stanhope	O.C.,CWS	Randolph, Vt. Trans. from Cav-Res. 10/15/25. BA Group, Edgewood Arsenal.
Browning, Charles A.	O.C.,CWS	Perm. add: 215 No. 4th St.,Danville, Ky. Temp. add.:Indefinite; 948 Chicamauga Ave., Knoxville, Tenn. BA - School Bn., E.A.
Calkin, Frank G.	Unassigned	Solvay Clubhouse, Syracuse,N.Y. Apptd. 10/16/25; accptd. 10/22/25.
Donovan, Robert E.	Unassigned	225 Bush St., San Francisco, Cal. Trans. from Inf-Res. 10/24/25.
Dunkle, Cyrus G.	O.C.,CWS	1125 Hillsdale Ave.,Dormont,Pittsburgh, Pa. Apptd. 8/31/25; accptd. 9/8/25. BA - Edgewood Arsenal.
Fonda, Lyman D.	O.C.,CWS	Add chgd. from: 111 No. 3rd St. Goshen, Ind. to: 140 So. Pleasant St., Gainesville, Fla. BA - Edgewood Arsenal.

NAME AND RANK	ASSIGNMENT JURISDICTION	REMARKS
SECOND LIEUTENANTS (Cont'd)		
Halfacre, Charles H.	O.C.,CWS	119 Santa Ana St., Huntington Park, Cal. Apptd. 8/21/25; accptd. 9/21/25. BA - Edgewood Arsenal.
Humes, Harold L.	O.C.,CWS	1552 - 11th St., Douglas, Ariz. Apptd. 9/4/25; accptd. 9/22/25. BA - Edgewood Arsenal.
Johnson, Thomas B.	4th C.A.	Add. chgd. from: Coffeyville, Ala. to: 2100 - 1st Ave., Engr., Dept., Birmingham, Ala. TA Group.
Joyner, Houston C.	O.C.,CWS	Add. chgd. from: Episcopal School, Lynchburg, Va. to: 7 Park Place, Princeton, N.J. BA - 1st Gas Regt., E.A.
Kaplan, Bernard	O.C.,CWS	Perm. add.: 702 Marshall St., Hagerstown, Md. Old temp. add.: 99 Messerole Ave., Brooklyn, N.Y. New temp. add.: 19 Sayre St., Elizabeth, N.J. BA - 1st Gas Regt.
Lucas, Boyd D.	O.C.,CWS	Add. chgd. from: Box 1728, City Hall, Birmingham, Ala. to: Chief, Div. of Food & Dairy Insp., City Hall, Atlanta, Ga. BA - Chem. Div., E.A.
Murphy, Howard F.	8th C.A.	Add. chgd. from: N. Mex. School of Mines, Socorro, N. Mex. to: Box 114, University Station, Tuscen, Ariz. TA Group.
Neuman, Daniel	Unassigned	2224 Woodstock Ave., Swissvale, Pa. Trans. from CA-Res. 10/28/25.
Nichols, Francis L.	O.C.,CWS	10 Forest St., Brattleboro, Vt. Apptd. 9/21/25; accptd. 10/12/25. BA - Edgewood Arsenal.
Richardson, Marion W.	O.C.,CWS	Add. chgd. from: Yellow Springs, Ohio, to: 281 Prospect Ave., Highland Park, Ill. BA - School Bn., E.A.
Rolshausen, Ferd. W.	O.C.,CWS	904 Calhoun Ave., Houston, Texas. Apptd. 9/4/25; accptd. 9/19/25. BA - Edgewood Arsenal.
Rosa, Manuel C.	O.C.,CWS	Add. chgd. from: Div. 6, U.S. Patent Office, Washington, D.C. to: 109 So. Main St., Fall River, Mass. BA - Tech. Div., OC-CWS.

NAME AND RANK	ASSIGNMENT JURISDICTION	REMARKS
SECOND LIEUTENANTS (Cont'd)		
Selbe, Paul B.	3rd C.A.	Add. chgd. from: 1332 Harvard St., Washington, D.C. to: 2621 - 13th St., N.W., Washington,D.C. TA Group.
Showalter, Albert M.	2nd C.A.	Old perm. add.: 322 No. 3rd St., Camden, N.J. Temp. add. to 12/31/25: 530 Virginia Ave., Harrisonburg, Va. TA Group.
Sutcliffe, Albert J.	9th C.A.	Add. chgd. from: Warren, Ariz. to: 409½ W.110th St.,Los Angeles, Cal. TA Group.
Van Deren, Larry	O.C.,CWS	Add. chgd. from: St. Catherine Hotel, Avalon, Cal. to: 233 Walnut St., Huntington Park, Cal. BA - Prod. Div., E.A.
Van Orden, Seymour L.	O.C.,CWS	Add. chgd. from: 60 Spencer Ave., Owego, N.Y. to: 293 Main St., Owego, N.Y. BA - Chem. Div., E.A.
Wakerlin, George E.	O.C.,CWS	Add. chgd. from: University Club, Madison, Wis. to: 6353 So. Wood St., Chicago, Ill. BA - Med Res. Div., E.A.
White, Stanley F.	O.C.,CWS	2 Center St., Shirley, Mass. Discharged 9/30/25 - failure to locate. BA - School Bn., E.A.
Wilson, George E.	Unassigned	1834 So. Canal St., c/o Adams & Elting Co., Chicago, Ill. Apptd. 10/12/25; accptd. 10/19/25.
Wolfe, Richard E.	O.C.,CWS	108 E. Maple St., Clyde, Ohio. Apptd. 10/3/25; accptd. 10/17/25. BA - Edgewood Arsenal.
Almquist, Herman J.	O.C.,CWS	1025 Fifth Ave., Helena, Mont. Incorrectly reported in October issue as Captain)

RESERVE OFFICERS PLEASE NOTE.

It is requested that any errors or omissions noted in these lists of Reserve Officers, be reported to the Personnel Section, Office, Chief, Chemical Warfare Service, Munitions Building, Washington, D.C.

TABLE OF CONTENTS