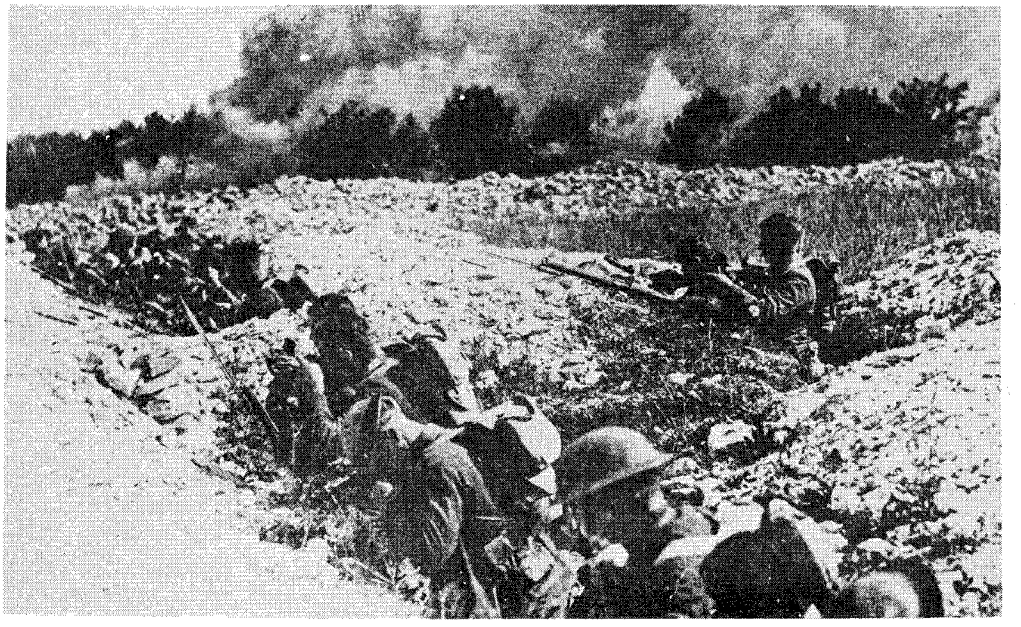
The Americans were not always so fortunate in responding to gas attacks. On 26 February 1918, at 1330 in the Ansauville sector, men of the 1st Division received the first German projector attack directed against U.S. forces. The estimated 150 to 250 bombs contained phosgene and chloropicrin. Conditions were ideal for such an attack: the heavy evening air kept the gas low to the ground, and what wind there was soon became calm. The bombs fell over a 600-meter front, where heavy underbrush held the gas in place. Of the 225 men exposed, 33 percent (eighty-five men) became casualties. Two men died soon after the attack, and six soldiers succumbed after they reached the division field hospital.

Col. Campbell King, 1st Division Chief of Staff, believed that there were several causes for the casualties. The sudden attack caught men unprepared on sentry duty or in their dugouts; they did not have adequate warning to adjust their masks or lower the gas curtains. After the attack, men removed their masks on their own initiative, or changed to the M-2, although the gas lingered in a dangerous concentration. Furthermore, the unmasked doughboys remained or worked in the dugouts and in low places in the woods, where gas stagnated. A captain who witnessed the attack amplified the Chief of Staff's observation. He reiterated that the premature removal of the mask, a breach of discipline, caused casualties and that the men failed to mask in time and to lower the gas-proof curtains. At the same time, the soldiers neglected to put out fires in the dugouts, thereby drawing gas from the trenches into the sealed shelters. Men who were only slightly gassed exerted themselves, contrary to standing orders, thus complicating their symptoms. The captain attributed the donning of the M-2 to the discomfort involved in wearing the SBR. A field hospital report mentioned that one man had had his mask disarranged in an attempt to force a mask on a comrade who had gone berserk and torn off his own mask.[25]

In another commonplace incident, an entire platoon of infantry in the 28th Division became gas casualties before they reached the front. While moving forward one night toward Châuteau Thierry, the men stopped to rest in shallow shell holes near the road. A recent rain had diluted the usual smell of mustard, and no one advised the green troops that the holes were craters from Yellow Cross shells. Unwittingly, they slept through the night in fresh mustard contamination. The following morning the men awoke with backs and buttocks so badly burned that the skin appeared to be flayed. The battalion gas officer could only try to relieve their agony with generous applications of Sag paste. That same day the 28th Division's gas officer noted his dwindling supplies of paste and masks. Since German gas seemed to be "coming over in increasing quantities with the resulting casualties," he ordered one of the battalion gas officers back to the SOS depot at Gievres on a foraging expedition to secure antigas supplies for the division.[26]

There were times when division, regimental, and battalion gas officers, in their more zealous attempts to prevent gas casualties, ran afoul of line officers. A battalion commander in the 23d Infantry, 2d Division, complained to his superior that the requests, orders, and reports required by the

regimental gas officer were "absurd, ludicrous, and, in many cases, impossible" to carry out. For instance, the gas officer had ordered that all men within 1,200 yards of the front line must sleep in gas-proof dugouts with a sentry posted over each. If this order were respected, the commander complained, no one in the unit would get any rest because the facilities for compliance did not exist. Another directive informed the infantry officer that men exposed to mustard should take a warm bath and change uniforms. To this he replied, with frustration, "We don't get enough water to wash regularly." The battalion commander closed his letter by explaining how tired he was of receiving directives "doped out of a book." Staff officers, he believed, must become more aware of the conditions at the front.[27]



Infantrymen of the 28th Division masking during a gas attack, 23 August 1918.

Likewise a division commander complained that new gas officers were "almost hysterical" in their attempts to educate the troops in gas defense. "Knowledge and real efficient training," he observed, "came after hard experience" and the "hysteria" of gas officers passed. When the 1st Division suffered 800 gas casualties at Villers-Tournelle, General Bullard complained of a report filed by a GHQ gas officer who, he believed, "spoke without knowledge or consideration" in a tone of "superior criticism" that comes from "abstract study." After Bullard complained, the officer's superiors ordered all gas officers to abstain from such criticism. Fortunately, incidents such as these were the exception rather than the rule, and line officers eventually realized that the gas officers were there to help them, not to harass them.[28]

Still, the job of gas officer continued to be a demanding one, especially in regard to defensive training for replacements. The "square"* World War I division had a Table of Organization strength of approximately 28,000 officers and men. In this war of attrition with high casualties (referred to as "wastage"), these large square divisions had a constant flow of new men into the ranks. The 1st Division, for example, after 223 days in the line, received over 30,000 replacements. The 2nd Division's statistics were even more striking: following 139 days in the trenches, it took in over 35,000 new men. Six other divisions received over half their strength in replacements, and another five received over a third. The rapid mobilization and rush to send men overseas led to a situation in which men had little overall training. The 42nd Division, after some time in the trenches, withdrew to train for the St. Mihiel offensive. During this time the division received replacements, "cannon fodder if there ever was any." One company obtained forty-three new men of whom "one man had had but one week of training; four had had two weeks; twenty had had three weeks; six had had four weeks"; and the balance had had between one and three months. Gas officers were therefore faced with a continual personnel training problem, having to instill a proper respect for gas defense in green officers and men.[29]

Protecting officers and men of the AEF required more than training. Contamination of food, water, tobacco, and equipment by chemical agents emerged as a significant problem for gas officers. On an interim basis the Gas Service issued tar paper and oil cloth to cover food and tobacco. Water contamination was always a problem, because the scarcity of water often compelled men like a 79th Division doughboy at Montfaucon to risk drinking from a suspicious source. Driven by thirst, this American ignored the warning of French soldiers and drank stagnant water from a shell hole. He later suffered chest pains from the gas contaminated water. After being evacuated he eventually returned to his unit, but only after twenty-three days in a base hospital. No one ever devised an effective means to stop troops from drinking contaminated water. Late in the war, the Quartermaster Corps packaged foodstuffs destined for France in gas-proof, airtight trench ration containers.

As for equipment, the corrosive properties of most war gases created problems of contaminated artillery shells not being able to be chambered, breechblocks jamming, gun surfaces rusting, and contaminated small arms cartridges not chambering properly. AEF regulations required weapons and shells be cleaned with oil immediately after a gas attack, but the metal continued to corrode unless small arms were disassembled and boiled in a solution of sodium bicarbonate and water. The difficulty of applying this decontamination method in the trenches, not to mention in No Man's Land during a prolonged assault lasting several days, can be well imagined. Protection of animals was also a problem, and they, too, were fitted with protective masks.[30]

When doughboys went "over the top," they, their commanders, and their gas officers alike faced increased challenges and "many difficulties not met

*The term "square" comes from the fact that the division had four infantry regiments.

The use of chemical agents created problems not only for the combat arms but also for the Services of Supply, the logistical tail of the AEF. Here mules and men are masked for a drill, November, 1918.

with in trench warfare." At times, good gas discipline had little or no impact on casualties in the maelstrom of battle. The reports of gas officers constantly referred to gas casualties caused by men being "knocked down, or shocked and stunned" by German high explosive shell fire. The concussion of the exploding shells slowed the men's reaction or worse, knocked them unconscious, and they never had a chance to put their mask on. Many times the blast tore off a mask or flying shrapnel cut the facepiece or damaged the hose from the filter to the mouthpiece. The extensive use of gas both at day and night often meant prolonged use of the mask. Lt. Robert A. Hall, for example, blamed a significant number of the 1st Division's gas casualties at Villers-Tournelle on the fact that after seventeen to eighteen hours of good gas discipline wearing the SBR, perspiration impregnated with gas seeped under the elastic head band. Perspiration also caused the nose clip to slip, and as a result, men inhaled poisonous vapor or had their eyes affected and, as a consequence, became gas casualties.[31]

Troops caught in the open by enemy gunners often sought cover in shell holes, ravines, and patches of wood, the very places where gas lingered the longest. Even if men maintained strict gas discipline, casualties were inevitable when the enemy concentration of gas shells became too dense. From 0600, 12 October, to 1600, 13 October 1918, the 114th Infantry, 29th Division, attacked German positions at Bois Ormout. The Germans fired an estimated 2,000 gas shells at the regiment in bursts of about 300. Yellow, Green, and Blue Cross 77-mm and 105-mm shells landed around the 1,500 men of the 114th Infantry while they deployed in ravines, shell holes, and wooded areas. As a consequence, 500 men became gas casualties, mostly

with lung injuries. The commander requested permission to evacuate the contaminated area. The French 66th Regiment commander, who had operational control of the attack, told him to remain in place. The Frenchman believed the withdrawal of the regiment was not tactically sound, for the Germans would counterattack if they detected any sign of an Allied retreat. Maj. James H. Walton, the division gas officer, remarked that this incident, in which high gas casualties were inflicted despite good gas discipline, was one of the "best examples of the deadly effects of gas shell" he had seen in combat.[32]

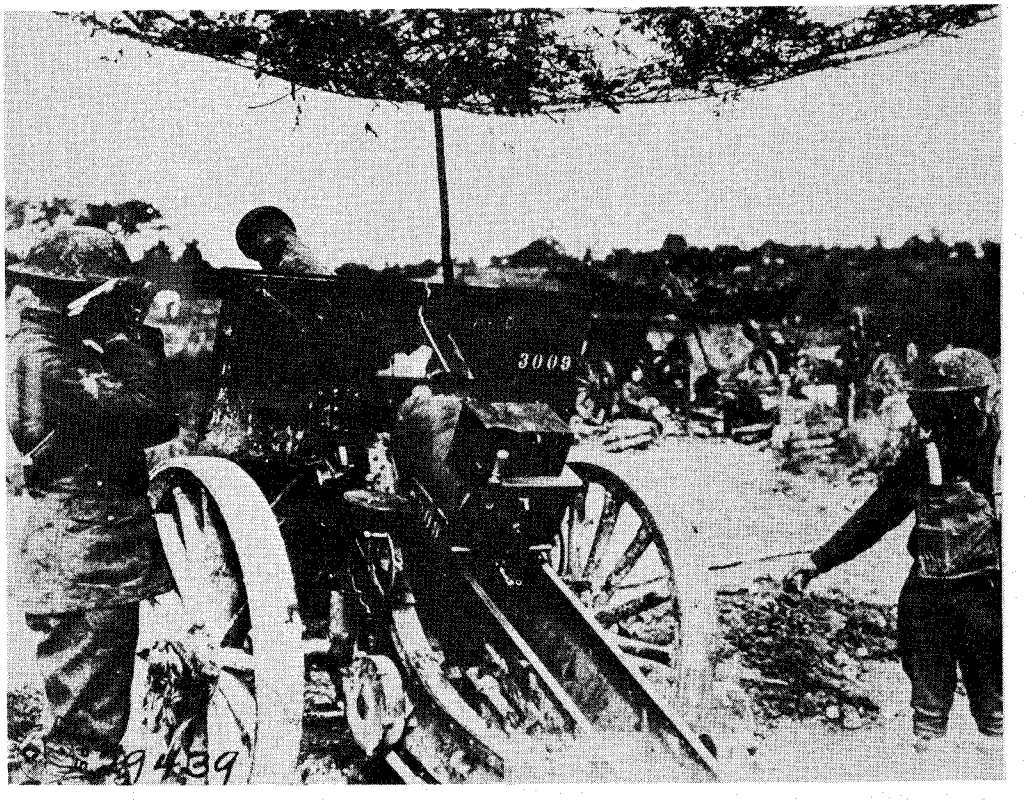
Combat decisions that had little reference to gas warfare often resulted in incurring or aggravating gas casualties. For example, although AEF tactical doctrine called for the preselection of alternate positions, many requests to relocate infantry units during combat were denied even though the tactical situation and the enemy's use of chemical agents called for relocation. In the determination to show the AEF's battle prowess, many of its senior commanders were loath to give up an inch of occupied or captured ground. In one such case, on 15 July 1918, the commander of the 30th Infantry, 3d Division, filed a graphic report of the unit's plight after repelling a German attempt to cross the Marne. His men, after being shelled with various chemicals for ten hours, were "absolutely worn out." They had not had "even a drink of water" during that time. The shells landing in their sector contained mustard, chloropicrin, and "chocolate" (diphosgene has the odor of candy) gases. If the men remained in their contaminated uniforms, he noted, they were certain to become gas casualties, because the mustard gas would eventually reach their flesh. It was "absolutely impossible" to feed the regiment because the rations had been contaminated by the gas. He reported to division that "they are still there in the line and they will hold the line, but they ought to be relieved. . . ." They were not.* Such decisions exhibited a crucial lack of understanding of the nature of gas warfare.[33]

Like the infantry, AEF artillerymen and animals suffered under the fury of German gas shell bombardments. While nonpersistent gas caused artillerymen problems in their attempt to deliver accurate fire, "mustard-yellow cross gas," remarked a cannoneer with the 91st Division, "seems to be about the only Boche weapon of which the men are really afraid." Efforts were made to displace batteries subjected to counterbattery gas attacks, but this was difficult and time consuming. To assist the artillerymen who had to remain in a gassed area, the French *Tissot* mask was issued when available. As previously noted, not only did this mask's filter offer less resistance to breathing, but the problem of fogged vision associated with the SBR did not exist. Most important, without a nose clip and mouthpiece it was a very comfortable mask to wear. In addition to the *Tissot* mask, gas gloves made of oil cloth were issued together with "impervious clothing." However, because the antigas suits were not ventilated, men would tear them off in warm weather even while working in an area reeking with

*Gas casualties for the 30th Infantry during the period 14—20 July 1918 totaled 202 out of a total of 600 for the 3rd Division. (Spencer, *Gas Attacks*, Part 1, p. 123.)

mustard. As an alternative to the protective coveralls, artillerymen used Sag paste. Many artillerymen shaved off all their body hair prior to an application of the ointment. "Every man in the firing battery," noted a gunner, "is now denuded of hair on top of his poll, under his arm pits, between his legs, and his underwear is soldered to him with 'sag paste.' "[34]

A horse and cannoneer masked during a gas attack, 1918.



Battery A, 108th Field Artillery, receiving and firing gas counterbattery fire, 3 October 1918.

The German use of chemical agents during World War I also placed a tremendous burden on a noncombat branch, the AEF Medical Department. Initially, no actions were taken at division level to provide medics with special expertise in the treatment of chemical casualties. As a result, division medical personnel were unprepared initially to handle the influx of gas victims. In the confusion of organizing and placing an American army in combat, it took GHQ, AEF, until October, 1918, to establish a uniform procedure to handle casualties.

The 42d Division, the second most experienced American combat division of the AEF, appointed a gas medical officer—a position that eventually all divisions of the AEF were ordered to establish. The 42d's decision to appoint a gas medical officer came in the wake of several disastrous contacts with chemical agents in the division's early combat. One such incident occurred on the evening of 20 March 1917, when approximately 400 German mustard rounds and 7,000 high explosive and shrapnel shells landed on a position manned by the division's 165th Infantry. The weather conditions were excellent for the persistent mustard agent. It had rained earlier, and there was no breeze to dissipate the gas as it hung in the air. At midnight, men began to suffer the delayed effects of the gas. Company K lost two-thirds of its effectives. A week later Lt. Col. H. L. Gilchrist, Medical Director of

the AEF, reported observing at a base hospital 417 gas casualties from the 165th Infantry.[35]

As the intensity of fighting increased, so did the number of men who claimed they were gassed, further burdening the Medical Department. Many shell-shocked soldiers or men who suffered from exhaustion and hunger believed themselves to be victims of gas poisoning. Others panicked after smelling shell fumes and reported themselves gassed. Then there were the shirkers who feigned being gassed. "The symptomology of gas poisoning is so complex," observed Maj. William V. Sommervell, 3d Division Gas Officer, "and at the same time so indefinite" that anyone who claimed to be gassed was immediately sent to the rear.[36]

As a consequence GHQ, AEF, expanded the number of medical personnel available to diagnose gas victims and weed out malingerers. At the hospital to the rear, division medical personnel devised several traps to detect suspected malingerers. One trap involved offering the gas casualty a large meal. Men on the front line were always hungry; they rarely had enough to eat. But a gas victim's symptoms would include a loss of appetite, so anyone who devoured the food found himself promptly returned to the line. Medical personnel also offered suspected malingerers a cigarette laced with diphosgene. If the soldier gagged he was feigning gas poisoning. Some idea of the magnitude of the problem may be derived from one division field hospital commander's establishment of a board to review the 251 gas cases

Lts. Lautell Lugar and William A. Howell, Medical Corps, attending wounded to the rear of the first trench line during a gas attack, 27 October 1918.

in his wards. The board's report indicated that only ninety of the men actually suffered from gas poisoning. The problem, though, was never satisfactorily resolved in the AEF.[37]

The Medical Department processed gas casualties in combat divisions, using procedures similar to those used for sick and wounded. Medics at the battalion aid stations did what they could for the gas wounded. This consisted of plastering Sag paste on mustard burns, often having to cut a uniform open to expose the swollen flesh. A wet compress applied over the eyes eased the pain of those blinded. Men who inhaled mustard gas could only be comforted with words, for no treatment could ease their pain. Medics could do nothing "but try to put [the] mask back on and get them to a Field Hospital." From the battalion aid station, men moved to the "Ambulance Head," the closest point to the line safely out of reach of German artillery fire. When possible, all gas casualties rode to avoid exertion. Men blinded by chemical agents were usually led to the ambulance head by comrades who could see, although in some instances, large numbers of blinded soldiers groped their way to the rear by holding on to a cord set up by the medics.[38]

When possible, division field hospitals were located in the same general area, with one hospital designated to handle gas victims. At this hospital the division medical officer supervised triage. Soldiers were placed into one of the following categories: fit for duty, immediate return to unit; fit for

Gas casualties from the 2nd Battalion, 326th Infantry, 82nd Division, waiting for evacuation, Argonne Forest, Ardennes, France, 11 October 1918.

Loading 89th Division gas patients at a field hospital north of Royaumeix (St. Mihiel Sector), 8 August 1918, for removal to a base hospital in Toul. Stretcher bearers wear makeshift burlap mittens to protect hands from gas-infected clothing of victims.

duty in twenty-four hours, return to unit; severely gassed, evacuate to an Army hospital. Exhausted men who complained of gas symptoms but who showed no outward signs of having been gassed were held in the division rear for rest, food, and observation. If medics verified their claims to gas poisoning, they too were evacuated.[39]

Division gas hospitals had to be located near a source of water because persistent and even nonpersistent agents clung to clothing, hair, and skin. After admission to a hospital, doughboys stripped off all their clothing and showered. Those casualties with serious symptoms were bathed while still on their stretchers. The bath house of the 2d Division gas hospital had a portable heater and six shower heads. When a doughboy left the showers, medics sprayed his eyes, nose, and throat with bicarbonate of soda. Depending on the diagnosis, the patient might be given a special treatment of alkaline, oxygen, and, if necessary, venesection (bleeding) to counteract the effects of inhaled gas. For those soldiers who had eaten food or drunk water contaminated by gas, doctors prescribed olive or castor oil to coat the irritated stomach linings. When treatment failed to allow free breathing, or when the patient developed additional symptoms, medics immediately

evacuated him to a base gas hospital. By November, 1918, the Medical Department was well on its way to developing procedures to handle gas victims.[40]

If American defensive doctrine and procedures for dealing with gas warfare were rudimentary or nonexistent to begin with and evolved during the war, the same was true of offensive gas doctrine and procedures. The American Army's Artillery Corps had not determined its own doctrine for gas warfare prior to entering combat. Instead, U.S. artillerymen borrowed from both the French and British, as well as from the Germans. The first U.S. field manual for the use of chemical artillery shells was a translation of a current French manual. The AEF, emulating the French, classified chemical shell fire into two types of bombardment. The first type, destructive fire, consisted of two minutes of rapid fire with rounds landing in close proximity, so as to create a dense gas cloud that, given surprise, could inflict heavy casualties. The second type, a neutralizing bombardment, was fired over a longer period and was used to lower the enemy's physical resistance and morale. It also interfered with the enemy's activities by forcing him to wear a mask for extended periods of time. Mustard gas best accomplished neutralization according to the AEF field manuals.[41]

AEF manuals identified several kinds of missions that utilized surprise or neutralizing bombardment. For purpose of harassment, a neutralizing fire was used to exhaust and hinder the movement of enemy personnel. Interdiction fire was a kind of neutralizing fire that rendered positions untenable. Barrages in support of an infantry attack were to consist of 25 percent gas, or one gun per battery. The balance of high explosive fire disrupted enemy reinforcements and prevented counterattacks. AEF manuals duplicated German doctrine by ordering the inclusion of gas in all barrages; this would, it was hoped, deceive the enemy into believing a great concentration of gas was being fired at all times and cause him to mask frequently, thus wearing him down physically and mentally and limiting his ability to defend his position.[42]

Artillery counterbattery fire with gas came to be an extremely effective tactic. Before gas shells came into use, the attempt to neutralize enemy batteries on the Western Front required large amounts of high explosive shell. Regardless of the length of time or the number of rounds fired, complete destruction of the enemy's batteries was never accomplished. Between 1914 and 1916 the average length of time required for artillery counterbattery fire to be effective was estimated at over six days. By 1917, gas made it possible to neutralize a known artillery battery in as little as fifteen minutes. Effective counterbattery fire over a wide front could neutralize enemy artillery in only two to four hours. By the spring of 1918, artillery commanders called for gas shells constantly, and the number of rounds fired was limited only by the availability of such shells.[43]

Of special demand was mustard, the agent that had become the king of the chemical war. The effect of mustard shells was so striking that there was a "constant unfilled demand" for them. One division commander

remarked that when his cannoneers were at last issued the agent their morale soared. The arrival of mustard from French gas ammunition points in July, 1918, "caused a great jubilee" among AEF division artillerymen. That same month, on 2 July 1918, AEF General Order 107 allowed division gas officers to take an active role in the preparation of all plans involving the extensive use of gas by artillery and special gas troops.[44]

AEF tactical employment of mustard and other chemical agents improved somewhat as artillerymen became more experienced. If, for instance, the exact location of an enemy battery in a wooded area was unknown, an AEF battery would shell the access roads with mustard, rather than waste limited gas shells by dowsing the entire woods. The artillerymen would then fire high explosive shells to damage the access roads and make it difficult for resupply trains trying to reach the battery to avoid contamination. The enemy battery would soon have to move. This tactic was also used to block reinforcements passing through defiles or over bridges. It proved to be an extremely efficient and economical method of counterbattery fire.[45]

Unfortunately, many senior U.S. Army officers remained oblivious to the potential use of chemicals by artillery or special gas troops in the offense. When it came time for the AEF to launch its first major offensives at St. Mihiel and the Meuse-Argonne, the use of gas was minimal. In preparing for the Meuse-Argonne campaign, for example, the U.S. First Army Headquarters studied the spring offensives of 1918, where the Germans literally smothered the Allies with hundreds of thousands of gas shells in a relatively short space of time. To its credit, First Army HQ disseminated this information to its units and, in field orders during the campaign, urged subordinate corps and divisions to use gas. Gas was made available by the French to the Americans in a sufficient quantity to neutralize enemy batteries, strong points, and installations, and to produce casualties. The final decision to utilize gas, however, rested with the corps and division commanders. With little or no doctrine, training, or experience they were reluctant to employ gas. The offensive use of chemical weapons, according to one First Army general, "does not seem to be understood." Army-level operational planning for the campaign included extensive use of gas, but its use by corps and divisions was halting. While the First Army's divisions did gain some confidence in the use of gas towards the end of the campaign, they never really mastered its employment.[46]

After training with the British Special Brigade, the other gas offensive arm of the AEF, the lst Gas Regiment, went into action on 22 May 1918. The lst Battalion, lst Gas Regiment, which consisted of Companies A and B, reported for duty attached to the 26th Division. On 18 June, Company B, temporarily attached to the XXXII French Corps, conducted the regiment's first independent operation. At 2230, seven hundred 8-inch Livens projectors, emplaced the night before and loaded with sixty-pound drums of phosgene, were fired at two targets located 1,500 meters away. The first target was a company of infantry with one *Minenwerfer* (mortar) company and the second a reserve battalion of infantry. Artillery fired shrapnel and high explosive

shells in conjunction with the projector attack. A month later prisoners revealed that this attack caused at least fifty casualties, including ten enemy deaths.[47]

The AEF tactical doctrine for the employment of special gas troops cited the advantages of using gas in terms of accuracy, the extended casualty producing area, and lasting results. The doctrine noted the effectiveness of gas for the elimination of well-entrenched targets that high explosive fire could not destroy. The amount and type of chemical agent employed depended on the tactical situation, as well as wind and terrain features. Projectors, the primary weapon of U.S. gas troops, provided "the means for producing casualties and demoralization second to none." When used aggressively, Livens projectors could keep enemy forces off balance; when employed on a quiet front, they could lessen considerably the likelihood of that front being used as a place to rest battle weary troops.[48]

In the offense, special gas troops could be utilized, according to AEF manuals, in five tactical situations. In the first, they would precede an offensive operation, keeping enemy positions in a gas environment until attacking troops arrived. This tactic would cause casualties and demoralize and reduce the "fighting efficiency and morale" of the enemy. Second, gas employed by special troops could eliminate machine gun nests just prior to an attack. AEF 4-inch Stokes mortars offered the best means of eliminating a machine gun position: two to ten Stokes mortars firing phosgene could form a localized concentration, either creating casualties or forcing the masking or the abandonment of the gun. Third, gas was ideal for sustained operations. Each night, gas could be placed on enemy machine gun nests, strongpoints, and troop concentrations, thereby weakening future resistance. Fourth, after friendly forces had taken an objective, reorganized, and consolidated their positions, gas employment acted as a temporary check or block to potential enemy counterattack formations. Fifth, the doctrine stipulated that in a stabilized situation frequent surprise fire with projectors could create the high concentrations of gas on suitable enemy targets from one end of the line to the other needed to harass enemy troops. In addition, local concentrations of gas, fired from Stokes mortars on machine gun nests, mortar positions, strongpoints, trench intersections, and other sensitive points further reduced enemy morale and strength.[49]

In the brief time it was deployed, the 1st Gas Regiment never matched the sophistication of the British Special Brigade. With the return to open warfare, the 1st Gas Regiment made superhuman efforts to meet AEF needs and moved their Stokes mortars with advancing infantry rather than remain in the trenches, as the British did. The regiment mortar men became very proficient in using thermite shells against machine gun positions and in covering advancing infantry with smoke. The regiment did not, however, employ gas during the attack as extensively as it did thermite and smoke. Gas was used, though, in conjunction with smoke, in order to cause enemy troops to expect gas whenever they received smoke. This tactic forced the enemy to mask, further limiting his vision.

Many commanders resisted the employment of special gas troops. The use of gas was new to American commanders, so it came as no surprise to officers of the Gas Regiment that trouble occasionally arose with the unit they were to support. The 1st Gas Regiment company commanders, lieutenants and captains attached to infantry divisions, tried as best they could to explain what results gas would achieve. During the Saint Mihiel operation in the fall of 1918, infantry officers quickly took advantage of the close support furnished by the Gas Regiment, whose mortar crews knocked out German machine gun nests with thermite and created smoke to screen the U.S. infantry. Still, the infantry appeared reluctant to use gas consistently. When the American First Army launched its first attack, the 1st Gas Regiment did not support the offensive with gas.

During the Meuse-Argonne offensive, the 1st Gas Regiment did support American troops with gas. Company E, 1st Gas Regiment, attached to the 28th Infantry Division, bombarded enemy hilltop positions with Stokes mortar rounds of smoke, thermite, and "deceptive gas." Covered by this suppressive fire, doughboys executed a flanking movement and took the hill with very little difficulty. On 2 October 1918, Company F, while in support of the 33d Infantry Division, received authorization to fire fifty-six projectors loaded with phosgene bombs at German units near Bois La Ville. Results of the gas mission were unknown. Soon after, however, German artillery retaliated by firing a number of Yellow Cross rounds at the 33d Infantry Division. As a result, the infantry regiment being supported by the gas company refused to allow it to fire its scheduled second projector attack. The official history of the Gas Regiment indignantly reported that American troops near Bois La Ville constituted a "normal mustard target" for German gunners and that, "irrespective of our gas operations," the locale normally experienced such attacks.[50]

Company F fired one of the largest American gas bombardments of the Meuse-Argonne campaign in support of the French XVII Corps. The men of Company F installed 230 Livens projectors in two nights. To assist in the operation, 100 French soldiers with forty-seven horses pulled narrow-gauge rail cars containing projectors and shells to the front. At exactly 0330 on 16 October 1918, drums of phosgene, fired in a dense fog and rain, fell on a known enemy troop position. Corps artillery fired high explosive shells in conjunction with the attack.[51]

As the Meuse-Argonne operation continued infantry commanders gained confidence in the effectiveness of chemicals and increasingly called upon gas troops to exercise their skills. By the latter stages of the offensive, some division commanders actively sought out gas company commanders to support their operations. The 2d Division staff consulted the supporting gas company in planning an attack and, as a result, projectors were used for the first time preceding a significant American advance. The results confirmed the claims of the gas unit in that a large number of enemy troops became casualties; the gas cloud itself had a demoralizing effect on other German troops as the wind pushed it to the enemy rear.[52]

The initial hesitancy by the AEF to employ gas was judged understandable by an officer of the 1st Gas Regiment. The American Army was unprepared to engage in gas warfare when President Wilson committed it to battle. As a result, the use of chemical weapons and the defense against them became a deadly learning process for all branches of the Army under the stress of battle. Many commanders were simply unwilling to employ a weapon with which they had had no prior experience and which, if used, could invite German retaliation in kind. For those commanders who did allow the use of gas, some became enthusiastic supporters of offensive gas operations; some did not. The American experience with the offensive use of gas remained uneven to the end of the war.[53]