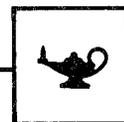


“The Quick and the Dead”: The AEF on the Chemical Battlefield

5



Between 18 and 21 January 1918, units of the U.S. 1st Infantry Division relieved the French 1st Moroccan Division manning the front lines in the Ansauville sector. In doing so, the “Big Red One” became the first American division to occupy a portion of the Western Front. The movement of American troops into the lines was uneventful except for one incident. “As we take our positions in the trenches,” Maj. Gen. Robert Bullard, the division commander, noted, “from the French position on our right some two hundred gas casualties are evacuated—our first object lesson.”¹

This grim “object lesson” reinforced French warnings that the Ansauville sector was a highly active gas front with both sides constantly employing large amounts of chemical agents. The German use of Yellow Cross especially concerned the French. The XXII Corps commander, prior to the arrival of the 1st Division, had his troops post in every dugout instructions in English on the correct procedures to follow during and after a Yellow Cross attack. The French warning advised the Americans to mask when the first gas shell exploded and remain masked for four hours following a gas bombardment. The instructions also called for anyone in a gassed area to beat and shake his clothing prior to entering a dugout and to use soapy water to decontaminate skin exposed to mustard. Further instructions from the French corps commander followed, emphasizing the gas-proofing of dugouts and the maintenance of gas mask discipline.²

Based on the 1st Division’s experience over the previous months, these instructions should not have been necessary. Although the unit arrived overseas without the slightest bit of gas training, it received in France the most complete chemical warfare preparation of any AEF division during the war. Gas training pamphlets, directives, and orders were showered on the 1st Division by an anxious and apprehensive GHQ, AEF. The 1st Division became the only American division to undergo the complete GHQ, AEF, training schedule, which included defensive and offensive gas training.*

*Even with this extensive training, the mistakes made by the soldiers of this division during chemical warfare were the very same repeated over and over by other, less prepared AEF divisions. In the Ansauville and the Montdidier sectors, the Big Red One suffered more casualties from gas than from small arms or artillery shell fire.



"Big Nims," 366th Infantry, 92nd Division, inspecting his mask (note mouthpiece), 8 August 1918.

Instruction in chemical warfare began for the 1st Division in December with nine hours devoted to defensive training. Proper masking was a key element of this training. With troops in the practice trenches, instructors sounded gas alarms and lit smoke pots to simulate gas clouds, thereby increasing the troops' "skill in putting on and wearing the gas masks." During the drill, gas instructors reminded their students that "in case of gas attack, there are only two classes of soldiers, the quick and the dead."³

The British had decided for reasons now obscure that SBR masking should take no longer than six seconds, to be accomplished in five steps. In step one, the doughboy had to hold his breath,* knock off his headgear, grip his rifle between the legs, and reach into the case on his chest to grasp the mask by the "breathing joint" and nose clip. At step two, the soldier thrust his chin out, held the mask in front of the face with both thumbs inside and under the elastic head band. In step three, the chin was

*Officers realized that, when exposed to German gas in combat, men instinctively took a deep breath. In so doing, they unintentionally inhaled the poisonous air. Later, the AEF corrected the drill by instructing the doughboy to "stop breathing" when the gas alarm sounded.

placed into the facepiece while the headband was pulled over the head to secure the mask. Next, at step four, the soldier grasped the mouthpiece with his teeth. The last step, five, required the soldier to reach through the facepiece to secure the nose clip and then run his hands around the mask to ensure a snug fit. Division gas officers complained that when it came to defensive gas training, many commanders were satisfied when their men simply achieved the six-second requirement. Proper adjustment, the gas officers believed, was more important than speed.⁴

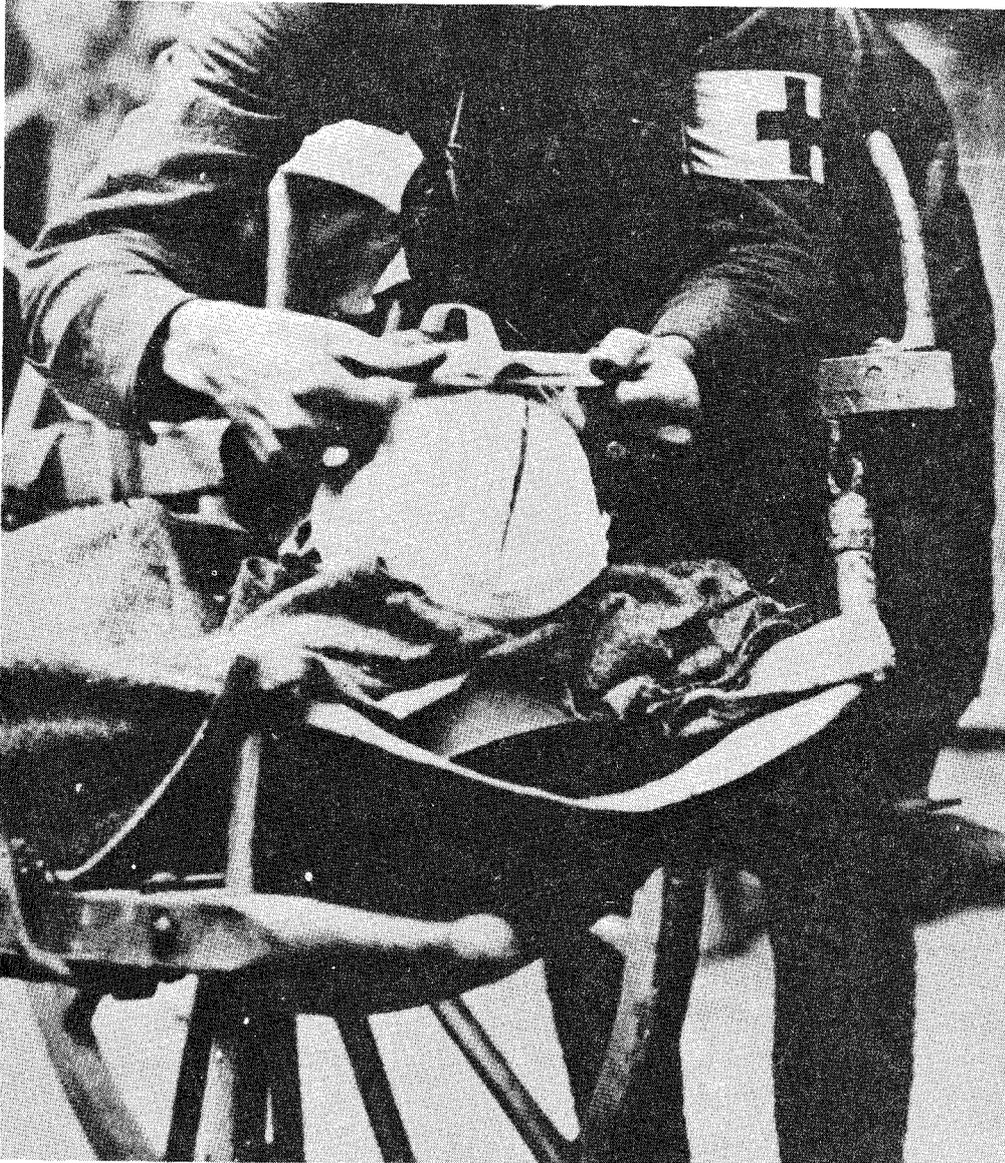
When finally issued, each mask came with a small log book tied to the canvas case. Soldiers received instructions to record the length of time they wore the mask, both for drill and in combat. They were also required to identify each type of gas encountered. The purpose of this log was to ensure that the filter in the canister was replaced at the proper interval. Filters for an SBR had a life of fifty to 100 hours of exposure, depending on the chemical agents. As might be expected, the log system did not work. As one gas officer remarked, "any man who in the hell of battle can keep such a record completely should be at once awarded a Distinguished Service Medal." Gas officers in some divisions came up with an alternative: they painted the number of the month of issue on the case. If and when filters became available, the officers replaced them based on their own estimate of exposure time. There were three types of AEF filter canisters. Those



Men of the 366th Infantry, 92nd Division, during an inspection of their American SBRs at Ainville, Vosges, France, 8 August 1918.

painted black were for training only and offered no protection against smoke or gas. Canisters colored yellow protected against smoke, offered greater gas protection, and had a high resistance to breathing. The green canister offered protection against smoke, had "sufficient" gas protection, and had a low resistance to breathing.⁵

While the British SBR was initially worn by the 1st and other divisions, the American version was in ready supply by the late summer of 1918. The



Medics place an M-2 mask on a head-wound casualty, 137th Ambulance Company, 31 August 1918.

American mask had both advantages and disadvantages. Although its fuller facepiece permitted easy cleaning of the eyepieces, these eyepieces had a tendency to fall out; also, the larger facepiece with an increase in dead space made it more difficult to clear. The larger canister gave greater protection, but was heavier and clumsy.⁶

There is no question but that the SBR, whether British or American, was extremely uncomfortable. General Bullard admitted that he could never "fulfill the qualification of a successful wearer" because as much as he tried he could not wear the mask longer than three minutes without feeling smothered. Since the SBR was difficult to wear, division gas officers reported troops would change from the SBR to the more comfortable M-2 in the midst of a gas attack, in the process inhaling the poisonous air. The M-2 did not offer the filtration protection of the SBR. Its flimsy construction and susceptibility to water damage also reduced its effectiveness, as did the fact that it did not block mustard gas. The widespread problem with the M-2 prompted AEF, GHQ General Order 78 on 25 May 1918. This order forbid anyone who entered the alert zone* to use the M-2. As noted previously it was retained and attached to stretchers for men with head wounds or for those unable to grasp the mouthpiece. Labor troops in rear areas were authorized to wear the M-2.⁷

A number of U.S. officers apparently procured, on their own, another French mask, the ARS (described earlier). This created morale problems since it gave American enlisted men the "impression that our protective equipment is defective." A Gas Service report demanded that these officers "be taught" that only the material issued by the Gas Service was authorized for use, and that they had no authority to secure equipment from the French.⁸

Another mask, the *Tissot*, was officially procured from the French, although it was for issue only in "small numbers" to artillerymen, Signal Corps troops, and front-line medical units whose personnel had to be active during gas attacks. Not only did this mask's filter offer less resistance to breathing and have the same quality filtration of the American SBR, but the problem of fogged vision associated with the SBR did not exist. The *Tissot* design allowed air to flow between the two lenses of each eyepiece, eliminating condensation. Most important, the *Tissot* design did away with a nose clip and mouthpiece, making it a comfortable yet safe mask.⁹ Unfortunately, as noted earlier, the filter location on the back, together with the flimsy rubber facepiece, made it unsuitable for infantry.

If soldiers wearing gas masks in defensive positions experienced a variety of problems, they encountered even more difficulties when they shifted to the offensive. The standard issue American or British SBR made *normal* breathing difficult; it made obtaining sufficient oxygen during heavy exertion, such as in infantry attacks across No Man's Land, impossible. Additionally,

*"Standing Orders for Defense Against Gas" published in November, 1917, stated that within two miles of the front lines and within areas specially exposed to gas shelling, the gas mask case would be carried in the alert position, which was on the chest.



Lt. William T. Powers, Pvt. Walter Miesley, Operator, and Pvt. Richard Pereyer, Recorder, wearing the *Tissot* mask while receiving instructions from a forward observer, 30 October 1918.

exertion caused perspiration to form on the lens, limiting vision even more than what was normal.*

At Ville Savoye, for example, Pvt. Moses King, 305th Infantry, 77th Division, had difficulty seeing through his mask and received an order from his company commander—whose own vision was obscured—to remove his facepiece, but to keep the nose clip and mouthpiece in place. This “pernicious habit,” the Chief, Chemical Warfare Service, AEF, noted in September 1918, “has been the cause of many casualties”; the practice has been “condemned at every opportunity.” Despite the condemnation, the practice never ceased, and the increased use of mustard gas by the Germans resulted in a significant number of Allied casualties suffering from eye damage.¹⁰

As a consequence of these and other problems, standing orders did not call for troops to mask during the attack. Doughboys did, however, wear the mask on the chest in the alert position with the helmet chin strap on the tip of the chin, rather than under it, to facilitate quick placement of the mask if gas were encountered.¹¹

*“Anti-dimming” (defogging) paste was issued with the mask, but according to soldiers who used it, it distorted the vision of the mask wearer.

In addition to the problems associated with gas masks, the persistency of chemical agents combined with the methods of AEF commanders to produce a significant number of gas casualties. Under normal attacking conditions, an area in which phosgene was used would clear in ten minutes. Diphosgene would take longer to dispel, perhaps fifteen to twenty minutes. Mustard gas would linger for several days. A problem arose, however, when AEF commanders intent on taking an objective regardless of the cost often launched an attack before a gassed area had cleared. The reason for this disregard lay in the fact that the AEF, from General Pershing down to division commanders, never hesitated to relieve an officer considered lacking in an aggressive spirit.

Of the chemical agents employed by the Germans against the Allies, mustard gas was responsible for 39 percent of AEF gas casualties. Once mustard gas made contact with the skin, it destroyed tissue as long as it remained, doing damage several hours before the first symptoms appeared. To combat this persistent blister agent, the Gas Service made available to line units an ointment called Sag paste* to protect exposed flesh. Sag paste came in a 3.5-cm by 16-cm collapsible tube and became a standard-issue item for the prevention and treatment of mustard burns. According to one veteran, it looked like and had the consistency of "carbulated vaseline." Doughboys who entered a mustard-contaminated area or who anticipated a shelling of Yellow Cross smeared their bodies with the ointment. It proved very effective, a medic in the 35th Division noted, if used in time. However, it was uncomfortable because it caked when the men perspired and rubbed off on clothing when a soldier engaged in any physical activity. The paste also presented a danger: if not removed after exposure to gas it eventually absorbed the mustard agent without neutralizing it, which meant that the agent ultimately came into contact with the skin. There were other uses for the paste: medics, for example, found it to be effective in soothing mustard burns by blocking the oxygen to the contaminated area. Enterprising men in the trenches found it extremely effective in exterminating "cooties," the doughboy slang for body lice.¹²

The Defense Division, CWS, sought other ways besides masks and Sag paste to protect troops from mustard gas. The division designed and had manufactured a protective suit for artillery gun crews, medics, and decontaminating teams. The suit consisted of cotton sheeting impregnated with linseed or "vegetable drying oil." The coveralls had elastic ties at the ankles and wrists. A zipper down the center from neck to crotch provided an airtight fit. The hood was worn under the headgear. Mittens had been provided prior to the development of the suit and were "highly valuable . . . but somewhat stiff and clumsy."** Special boots were also provided to complete the uniform. Unfortunately, the suit trapped body heat and moisture so it could rarely be worn longer than fifteen to thirty minutes. A gas officer

*I was unable to identify the source of the term "Sag." Lt. Col. Charles M. Wurm, CACDA, Ft. Leavenworth, suggested "Salve, Antigas."

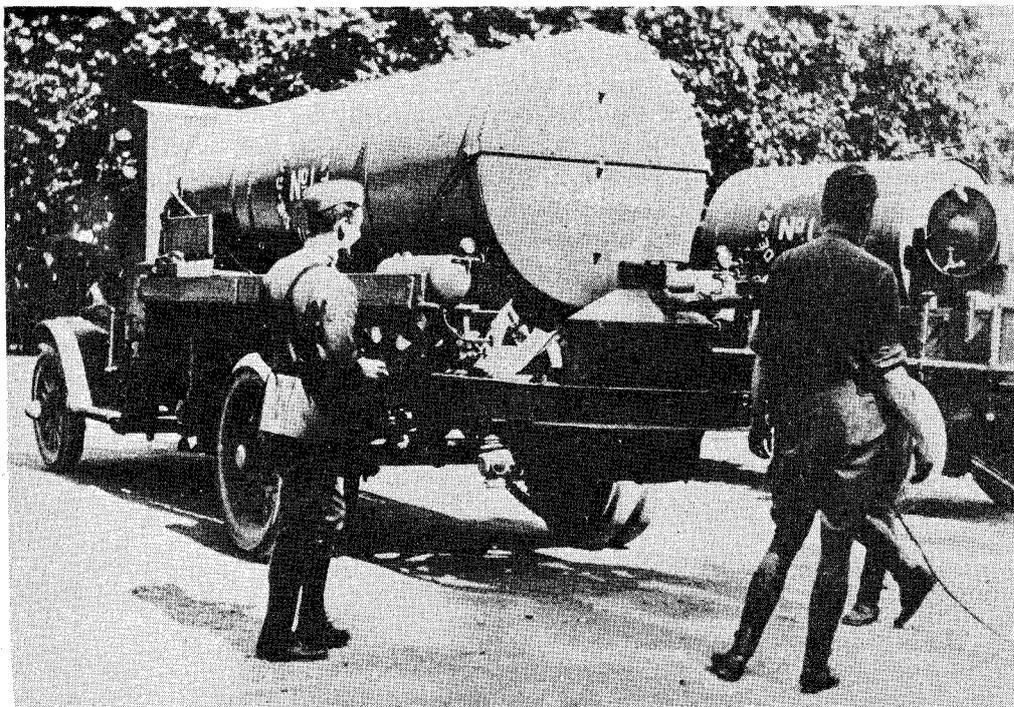
**Gloves were not available until the end of the war.

reported men tearing off the suit “while working in an area reeking with mustard gas because they couldn’t stand the discomfort any longer.”¹³

The effects of mustard gas could be lessened or even avoided by removing it with hot soapy water shortly after exposure. To this end, GHQ, AEF, on 29 August 1918, ordered the Medical Department to activate a number of



Pvt. John Sloan, 6th Infantry Medical Detachment, in an “Anti-Gas Suit,” Croix de Charent, France, 20 August 1918. This protective uniform was worn by medical personnel and artillery gun crews.



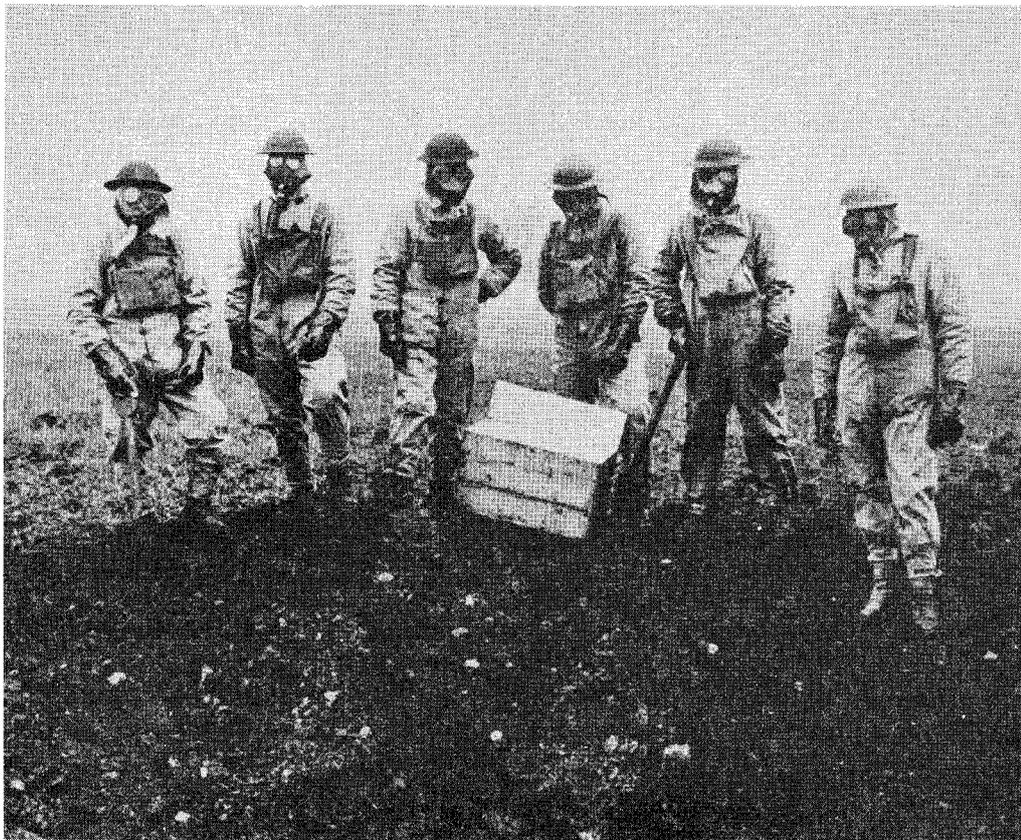
“Degassing Station” tank truck with heater mounted in the rear, Mobile Degassing Unit #1, Services of Supply, Tours, France, 21 July 1918.

“mobile degassing units.” Each division in the “line of battle” would have two such units attached, commanded by a Sanitary Corps captain or first lieutenant. To each eleven-man unit a specially trained medical gas officer would be detailed from the supported division. This individual’s duties included the supervision of the unit’s operation, instruction of the medical personnel on the treatment of gas casualties, and responsibility for the maintenance of the proper equipment for the treatment of gas casualties at the battalion advance aid station. The degassing units remained in the division rear. When a unit became contaminated and could be withdrawn from the line, the degassing station rushed to treat the men as close to the front as possible. The unit’s equipment consisted of a five-ton tank truck with a 1,200 gallon capacity and an “instantaneous heater” mounted on the rear of the vehicle to provide hot water. The heated water flowed to portable shower baths similar to modern field showers. Another vehicle carried fuel, underwear, uniforms, and medical supplies. These supplies included bicarbonate of soda to flush the patient’s eyes, ears, mouth, and nasal passages. Unfortunately for the thousands of mustard casualties, very few degassing units saw service, as evidenced by the late date of the order creating them.*¹⁴

*When the Armistice took effect, the few units that had reached the field were turned over to the Quartermaster Corps for delousing troops returning home.

While methods were being sought to "degas" men, efforts were also undertaken to decontaminate the ground they held in the static trench warfare. General orders created decontamination squads at regiment and battalion level. These units decontaminated shell holes with lime and new earth, buried gas shell duds, reported to gas officers the location of dud shells that could not be buried, and removed contaminated equipment and clothing in special oiled bags. Each man in the squad was issued a new SBR, a reserve M-2 mask, a suit of protective coveralls, and two pairs of oiled mittens. The decontamination equipment consisted of shovels, buckets, and long-handled tongs for handling dud mustard shells.

In the trenches, mustard gas and other agents were counteracted in a variety of ways. During a gas attack, standing orders called for as little moving about and talking as possible, because gas poisoning was sometimes intensified by exertion. Once an attack ceased, trenches were cleared of low lying gas. One method required the use of an Ayrton or trench fan. This device consisted of a two-foot-long handle attached to a rigid piece of canvas hinged to a fifteen-inch section that moved in one direction. In effect the fan was used like a shovel, with the moveable flap creating an upward air current, thus removing the gas. Americans adopted these fans as called for



A squad preparing to decontaminate a gas shell hole, 4 December 1918.



Men detailed to use Ayrton or British trench fans after gas attack, 1918.

by British defensive gas doctrine. Unfortunately, the fans, according to British General Foulkes, were “worse than worthless.” Not only did they not remove the vapor, but the exertion of masked users led to exhaustion and increased susceptibility to gassing.* The fans were eventually discarded and burned to create an updraft, soon recognized as a better method of clearing trenches and dugouts of gas.¹⁵

Another method of decontamination used in the trenches consisted of placing boxes of chloride of lime outside of dugouts. Prior to entering, men stepped in the substance, neutralizing any mustard agent clinging to the shoes. The Vermoral sprayer, which was a hand-pumped fire extinguisher filled with a sodium thiosulfate solution, could neutralize chlorine, but little else. The sprayers were used, however, to moisten the blankets at the entrances of the gas-proof dugouts.¹⁶

The prolongation of German gas attacks, the increased quantity of chemical agents fired in an attack, the extensive use of the persistent agent mustard, plus the fact that 80 percent to 90 percent of all gas attacks experienced by the AEF took place during the hours of darkness, made the construction of gas-proof dugouts essential for survival in the trenches (Figure 4). Basically, the gas-proofing of dugouts required a wood frame entrance and a snug fitting blanket, usually soaked with glycerine and kept damp

*Apparently the British Army first rejected the fan, an invention of Mrs. Ayrton, the wife of a distinguished physicist, but political pressure forced them to procure 100,000. The AEF Gas Service, unaware of the circumstances and not thinking to ask, ordered 50,000.

with a diluted solution of sodium thiosulfate. If space allowed, "complete protection" could be obtained by hanging two blankets over the entrance in such a way as to leave an air space between the two. Such measures made it difficult for men in front-line trenches to get out of a dugout rapidly in the event of an infantry attack, and for this reason early U.S. manuals advised against protection of front-line dugouts. But this advice was generally ignored because of the need to have a gas-free environment in which to sleep and occasionally remove the SBR. The same Army manual stated that "Medical aid-posts and advanced dressing stations; Company, Regiment, and Brigade Headquarters; at least one dugout per battery position; Signal Shelters and any other place where work has to be carried out during a gas attack should *always* be protected."¹⁷

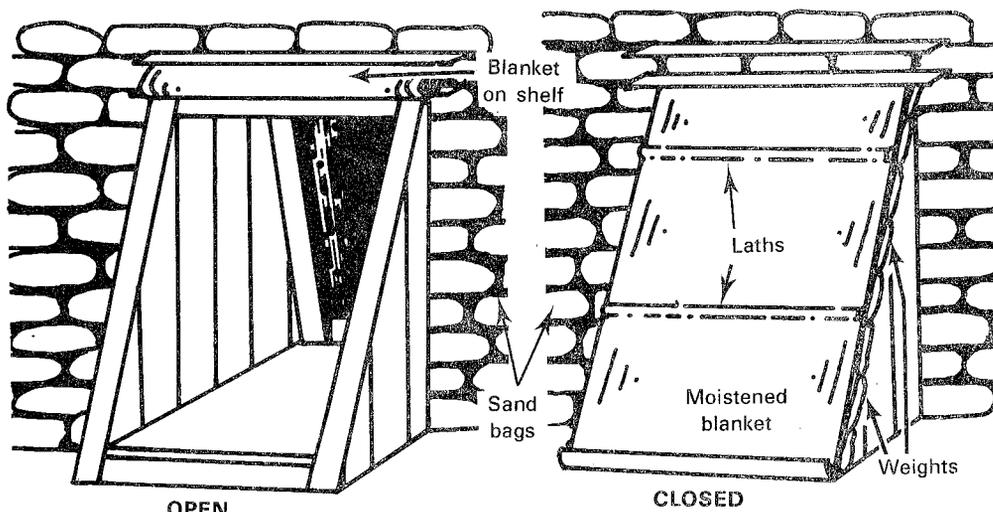


Figure 4. Entrance, gas-proof dugout.

Oftentimes, casualties occurred when a gas shell or projector shell fell at the entrance of a dugout and the force of the explosion threw open the blankets and drove the gas inside. On 27 May 1918, at the beginning of one of the German 1918 spring offensives, a concentration of 983 phosgene projector bombs caught doughboys of the 168th Infantry, 42nd Division, asleep in dugouts on the side of a ravine. The Germans, in order to keep the U.S. troops pinned in the gassed position, shelled the area in the rear of the ravine for an hour with shrapnel and Yellow Cross. The division G-3 reported one soldier killed and six wounded by shrapnel, 236 gassed, and thirty-seven gas deaths resulting from the attack.¹⁸

It was the duty of the gas sentry to sound the warning of a gas attack to the other troops. Usually the sentry received general instructions to alert his unit as soon as he heard the hissing sound of gas leaving cylinders, saw a cloud moving along the ground, observed a distant flash, heard a muffled explosion of projectors, saw a shell burst with a small pop, or sniffed a suspicious odor. In addition to shouting, "Gas!" he would, after masking, sound a mechanical alarm. Such alarms ranged from air horns, known as



Pvt. Demetry Melonisk, 315th Field Hospital, 304th Sanitary Train, 79th Division, carrying a church bell used to give gas alarms, 17 October 1918.

Strombos,* to metal shell casings, steel triangles, or even church bells. When, in the fall of 1918, the AEF went on the offensive, the Gas Service decided that Klaxon horns and European police rattles produced the most audible warning of gas to troops on the move.¹⁹

*Strombos horns carried for a great distance and were initially used for cloud attacks that occurred over a wide frontage. Later in the war, when attacks became more localized with projectiles and shells, the Strombos were phased out and replaced with alarms whose sound did not carry as far.

Whether on the move in open warfare or manning the trenches in static warfare, the most critical individuals in chemical combat were the unit gas officers. On 27 May 1918, AEF General Order 79 formalized and standardized defensive duties for gas officers, the positions having been created by individual divisions on their own initiative after arrival in France. Two months later, General Order 107 expanded the functions of gas officers: in addition to their previous duties, they would be advisers whose technical knowledge would be solicited "in the preparations of all plans involving the extensive use of gas, whether by artillery or by other means." Despite the order, staff officers too often told gas officers that their advice for offensive planning was not required and that they should concern themselves only with defensive duties. The success of division gas officers in integrating plans for the use of gas in offensive operations eventually depended on, in the words of the Gas Service's Chief, their ability to "go out and sell gas to the army." Despite such promotional efforts, resistance by staff officers continued. During the Meuse-Argonne campaign in the fall of 1918, an unidentified division gas officer reportedly recommended to a division operations officer (G-3) that gas be used during a particular phase of the engagement. The staff officer replied that he would employ the artillery firing gas shells only if the gas officer stated in writing that the gas would not cause a single American casualty. This request was unrealistic in that a thorough staff planner in World War I "usually included an allowance for casualties due to a friendly barrage."* Another objection raised to the use of gas was that commanders feared its employment would subject their men to unnecessary retaliatory gas attacks.²⁰

Even if a division commander and his staff were reluctant to employ chemicals, they could not afford to be careless about the protection of their troops from chemical agents. A unit's effectiveness depended on proper gas defensive measures. GHQ, AEF, delegated significant responsibility for gas defense to division, regiment, battalion, and company gas officers and NCOs. These dedicated and harried men attempted to insure that their respective organizations could cope with gas attacks while sustaining minimal casualties. Once in the trenches, exposed to a chemical warfare environment, most commanders soon realized the need for competent gas officers. After selection and training, gas officers had to prove themselves to the commander, staff, and the troops in the trenches. The most effective way to gain the respect and confidence of the troops, one gas officer discovered, was to join a unit under an attack. This practice offered a number of advantages. First, the gas officer learned the immediate effects of a gas attack and what individuals endured during such an attack. He could suggest corrections and give guidance during the attack, as opposed to afterwards, when men were already casualties. The confidence of the men in the gas officer's instruction grew when they observed him "take what they did." Infantry officers proved more willing to accept the advice of such a gas officer because they knew he spoke from "actual and not book knowledge."

*No figures for the AEF are available, but the French concluded that 75,000 or 1.5 percent of all their casualties were due to amicide (casualties caused by friendly fire).

This knowledge afforded the gas officer the credibility to obtain a "hearing and accomplish results" when he called to the attention of unit officers and staff both "good results of proper gas discipline and the bad results of bad discipline."²¹

While division gas officers worked with the staff, the regimental and battalion gas officers had the greatest impact on the doughboys. At these lower echelons, gas officers assumed a variety of responsibilities that ranged from instruction to inspection of defensive equipment and selection of alternate positions during an attack. It fell to these officers to assure that gas alarms were installed, gas sentries posted, gas alert signs displayed, and dugouts selected for gas-proofing. In addition these officers took wind readings twice a day.* When required, gas officers became bomb disposal experts who located and removed all unexploded enemy gas shells. As the Table of Organization for AEF units did not include gas officers, General Order 79 of 27 May 1918, which ordered the appointment of gas officers down to battalion level, caused some grumbling in recently arrived divisions. Plagued by a shortage of line officers, commanders assigned men to gas duties grudgingly. When the need arose, the men chosen were subjected to double duty as infantry officers.²²

With the absence of sophisticated detection and warning systems, one of the most important functions of a gas officer became the determination of when to give the order to mask and when to unmask. At gas schools, trainees were taught to "taste" gas, sniffing just enough air to identify a chemical agent by its own peculiar odor. They had to know the persistency and the properties of each gas and then be able to determine how soon after an attack the air would clear. Most of the officers became very proficient at identification. At times, though, some gas officers were "too conscientious" in "tasting" for gas and became casualties themselves.²³

When night settled in, gas officers in the trenches slept fitfully, waiting for the cry of "Gas!" One such officer described an evening that was shattered, after the troops had gone to sleep, by the sound of artillery followed by gas alarms. Everyone, he recalled, "came out of their holes" with masks in place, the "fine fruit" of constant training. The officer lifted his mask, sniffed, and determined the fumes to be from high explosive shells. After taking his mask off, the gas officer gave the all clear and the men unmasked. Toward dawn the men again awoke to the sound of gas alarms and cries of "Gas!" This time the officer raised his mask and detected the "mild pungent breath" of a chemical agent. He masked and told the others to do the same. A gas shell exploded upwind with a "light pop and puff of vapor." After the shells ceased dropping he checked up and down the line for casualties and found none. Several minutes passed, and he took another taste only to detect a lingering odor. Five minutes later a light wind drove the gas away, and the all-clear sounded.²⁴

*Early in the American involvement, AEF and War Department manuals listed cloud attacks as the primary delivery system of the Germans; when the wind blew from the east, therefore, troops went on a gas alert.