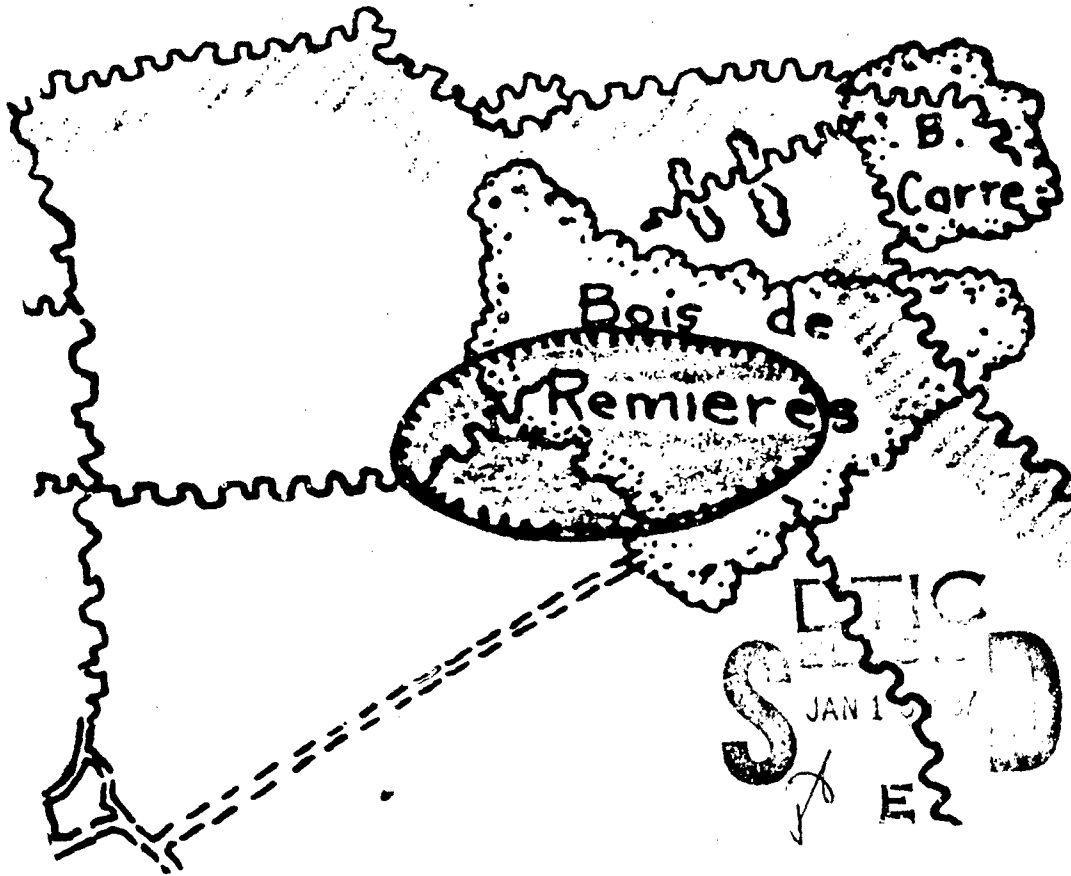


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U. S. ARMY CHEMICAL CORPS HISTORICAL STUDIES
GAS WARFARE IN WORLD WAR I

THE 1st DIVISION AT ANSAUVILLE
Jan - Apr 1918



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Study No. 9

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The 1st Division at Ansaerville
January - April 1918

by

Rexmond C. Cochrane



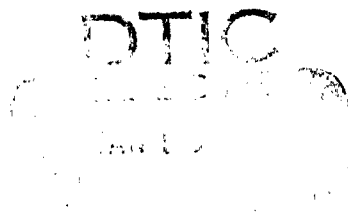
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The 1st Division at Ansauville
January - April 1918

Prepared by
Rexmond C. Cochrane, Ph.D.

Under Contract DA-18-108-CMI-6214 ✓

with
U.S. Army Chemical Corps

This is an accepted draft study on gas warfare in World War I

L. R. Currie

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Brigadier General, USA
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Foreword

This is a tentative study of the gas experience of the 1st Division during World War I. This study is not presented as a definitive and official history, but is reproduced for current reference use within the Military Establishment pending the publication of an approved history.

The author was assisted in his research by Mr. Guy F. Goodfellow and Mrs. Charlotte M. Bolin.

Note to Reader: Comments and suggestions relative to accuracy and adequacy of treatment are invited, and may be transmitted to the Chief, U.S. Army Chemical Corps Historical Office, Army Chemical Center, Maryland.

THE 1st DIVISION AT ANSAUVILLE
January - April 1918

by
Rexmond C. Cochrane

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THE 1st DIVISION AT ANSAUVILLE
January - April 1918

The 1st Division arrived in France without, apparently, any gas training whatever. Before going into combat it received not only the most complete combat training of any division in the AEF but the most thorough gas training. And gas training pamphlets, directives, and orders that later divisions were to seem ignorant of or profess not to have received, seem to have been immediately available and carefully studied by the 1st Division.

Despite this, the division was to make all the mistakes of human nature and inexperience when under gas attack that the other divisions later made, with the result that during its operations in both the Ansaerville sector, here described, and subsequently in the Montdidier sector (the subject of a later study), it was to suffer more gas casualties than small arms or artillery shell casualties. As General Bullard said:

Gas is such an intangible thing that men are only with great difficulty made to guard themselves against it. A state of instruction adequate against the danger is extremely hard to obtain....Our gas officers were almost hysterical in their efforts to teach and impress our new troops; but knowledge and real efficient training came only after hard experience.¹

The present study of the initial operations of the 1st Division concerns not only the gas training of the division but in particular a unique aspect of its experience not referred to in the well-known catalogue of "firsts" of

1

Lt. Gen. Robert Lee Bullard, Personalities and Reminiscences of the War (New York, 1925), pp. 193 - 194.

that division. It was perhaps the first and last division to suffer more artillery than infantry casualties, for the principal target of both enemy HE and gas fire at Ansauville was the 1st Division artillery, not the infantry.

On both quiet and active fronts in the months to come, the infantry would be the principal, or even exclusive, target of enemy fire, and it was to suffer, it would seem, from doctrine developed by the AEF for the special protection of the artillery, as a result of the early experience of the 1st Division.

The First Expeditionary Division

On 2 May 1917, a month after the American declaration of war, Maj. Gen. John J. Pershing received word that he was to go to France with four infantry regiments and an artillery regiment.² He "construed this message to mean that these troops were to form a division," and on 16 June 1917 the "First Expeditionary Division," made up of the 16th, 18th, 26th, and 28th Infantry Regiments, which had recently seen field service under Pershing's command on the Mexican border, sailed for France. With them went not one but two artillery regiments, the 5th and 6th FA, followed later by the 7th FA.³

2

Ltrs TAG to CG Southern Dept Ft Sam Houston, 23 and 26 May 1917, sub: Organizations designated for foreign service (World War Records, First Division, A.E.F., Vol. 1). The documents in each of the 21 volumes, hereafter cited as Records, are bound chronologically.

3

Pershing, My Experiences in the world war (New York, 1931), I, 2 - 3. This message was the genesis of the 40,000-man American division (with corps and army troops), more than twice the size of French, British, or German divisions. In July 1917, Pershing's Corps Sec in France secured formal adoption of this division. Ibid., I, 100.

The American division, which the French treated as a Corps, said Bullard, was outside "on account of unsuitable recruiting and replacement plans, [since] it could not be hoped that a command once depleted or reduced below a proper fighting strength could be promptly filled up again" (Personalities, pp. 75 - 76).

On 14 July 1917, while Pershing began organizing AEF headquarters, 1st Division headquarters was set up at Gondrecourt, northwest of Neufchateau (Map No. 1), with Maj. Gen. William L. Sibert in command. By early September the engineer, signal, and medical components of the division had arrived, the artillery under Brig. Gen. Charles P. Summerall had left for the training area at La Valdahon, and the formal training of the division began.

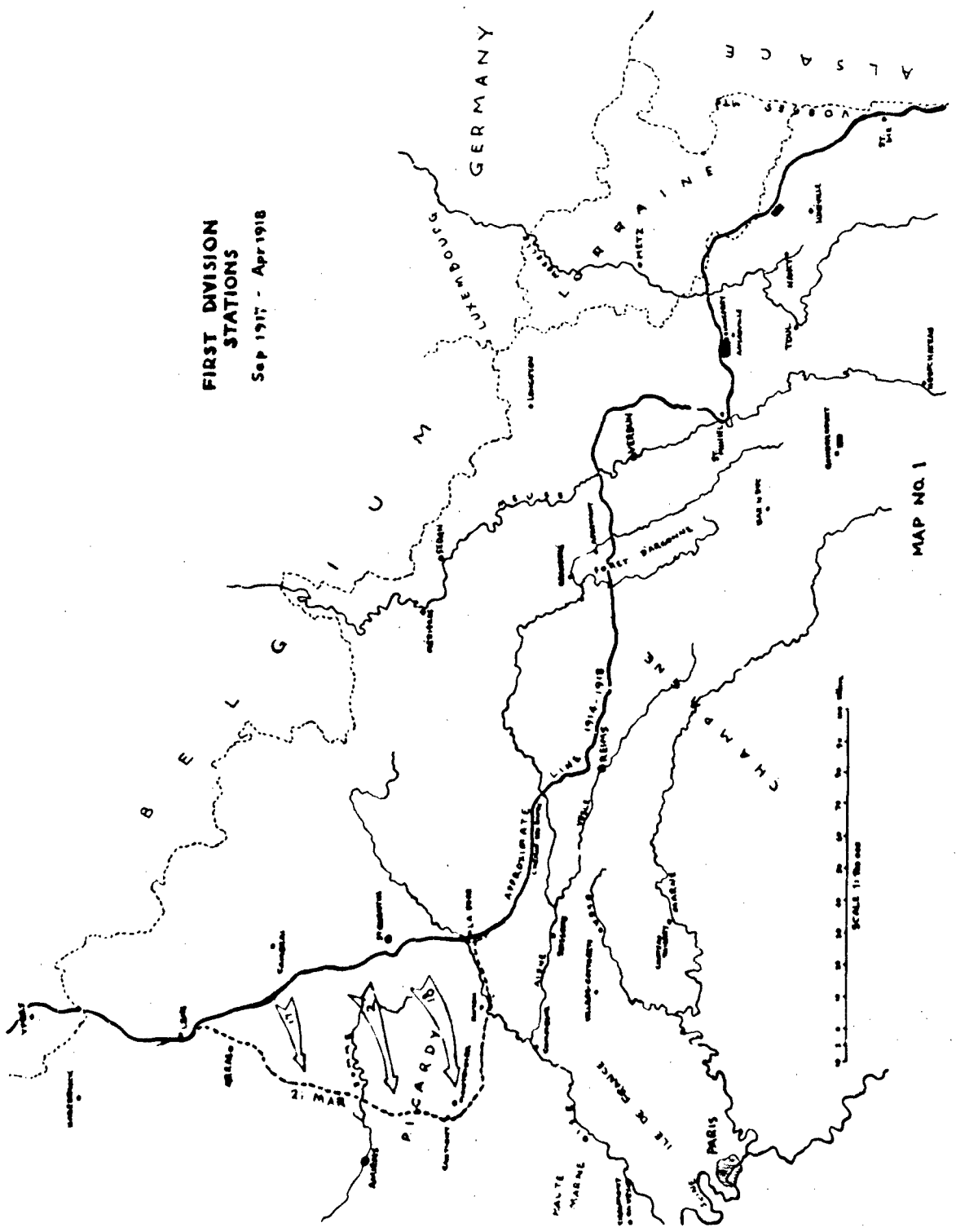
The 1st Division was the only one in the AEF to have sufficient time to undergo the entire course of training in France prescribed by GHQ AEF.⁴ This plan allowed one month for acclimatization and instruction under French tutelage in the battalions and lower units. The second month was spent learning trench warfare tactics, with French battalions in a quiet sector. During the last month, back of the line, the combined division trained in the tactics of open warfare. The division was then considered ready to take over a sector on the fighting front.⁵

As it began training in the practice trenches at Gondrecourt, the division was issued both the French M-2 gas mask and the British small box respirator

⁴ History of the First Division during the World War, compiled by the Soc of the 1st Div (Philadelphia, 1922), p. 371. Hereafter cited as History.

⁵ MS, Historical Sketch of the First Division in the World War (214 pp.), p. 16 (1st Div Box 11, 11.4). Hereafter cited as Hist Sketch. Since the narrative of operations in the History and in the Hist Sketch are essentially the same, for convenience the Hist Sketch will be most frequently cited.

FIRST DIVISION STATIONS
Sep 1917 - Apr 1918



(SBR). With them the troops received their first training in gas warfare as "gas alarms with imitation gas clouds were used to give skill in putting on and wearing the gas mask." Special attention was given to perfecting the men in adjusting the mask within six seconds of the alarm and to impressing on them the necessity of strict gas discipline. And they were told repeatedly that when the gas alarm sounded there remained only "the quick and the dead."⁶

Adequate as the gas training may have appeared at the time, it could not be foreseen in the closing months of 1917 how important gas would be in the operations to come. It seems probable that it may have been like the training with the machine gun, which was also considered essential but "had not assumed the importance that it developed in the last year of the war."⁷

Ready for experience under actual trench conditions, on 14 October the division was consolidated and ordered to the quiet Sommervillier sector, between Luneville and Nancy, in Lorraine.⁸ On the night of 21 October, a battalion from each regiment and designated batteries of the division moved in beside corresponding units of the 18th French Division and began training in caring for themselves in the trenches, in patrolling, observation, and artillery

⁶ Hist Sketch, p. 18.

⁷ Hist Sketch, p. 19.

⁸ FO 1, 1st Div, 4:00 P.M., 11 Oct (Records 1).

procedures. The battalions and batteries were rotated at ten-day intervals until all had been at the front.

The 1st Division was relieved on the night of 20 November and returned to Condrecourt, having lost 36 men killed, 36 wounded, and 11 captured.⁹ Back at Condrecourt, the division was stripped of large numbers of its officers, NCOs, and men to fill out GHQ staffs and furnish training cadres, and refilled from replacement units coming from the states. On 14 December, at Pershing's direction, Major General Sibert was relieved of his command and replaced by Maj. Gen. Robert L. Bullard, who had originally commanded the 2nd Brigade and more recently had been commandant of the schools of the 1st Division.¹⁰ After hasty training of the replacements, the division began its large-scale maneuvers, during which frequent "gas alarms and clouds of low-lying smoke to imitate gas would compel everyone to put on the gas mask as though his life depended upon it."¹¹ The 1st Division was ready to go into the line on its own.

9

Warning Notice, Opns Sec, 1st Div, 13 Nov (Records 1); Hist Sketch, p. 28. GO 67, 1st Div, 20 Nov (Records 5), said 14 were killed, 34 wounded, 11 captured.

10

Bullard, Personalities, pp. 95 - 96; Peyton C. March, The Nation at War (New York, 1932), pp. 266 - 268; Ltr, TAG Paris to CG 1st Div 18 Jul 1917, sub: Divisional training (Records 2).

11

Hist Sketch, p. 32.

Gas Instruction in the 1st Division

Despite the gas defense exercises from September on, a gas organization was not set up in the division until December, when 2nd Lt. D. B. Wright was appointed Division Gas Officer, with a staff of regimental and battalion gas officers and gas NCOs.¹² Implying that it was an innovation, the appointment of gas officers in the battalions "thought necessary due to the large number of villages occup. by the Division, and...to provide trained gas officers who might take the place of R.G.O.'s who might be assigned elsewhere or become casualties."¹³

A course of instruction was begun at once that included nine hours of training in offensive and defensive use of gas, with the troops carrying out maneuvers while masked. Gas mask drill and maneuvers, however, were hampered by a serious shortage of both British and French masks, and defective masks on hand had to be reissued for drill purposes.¹⁴ The shortage had still not

12

Opns memo 48, 1st Div, 1 Dec (Records 20); GO 79, 1st Div, 23 Dec (Records 5).

13

Ltr, DGO 1st Div to C of Gas Serv, 31 Dec 1917, sub: Rpt for month of Dec (Records 20). Because they were supernumeraries, GO 79 said BGOs might have duties other than gas officer. Gas NCOs were to have no other duties when in contact with the enemy. Note: Memo, Div Adj 2nd Div, 5 Jan (2nd Div Box 36, 64.6), designated RGOs but no BGOs.

14

Memo 45, 1st Div, 1 Dec 1917, sub: Instruction and training - Gas (Records 20); ltr, DGO to C of Gas Serv, 31 Dec, above.

been made up when the division left for the front.

Parallel with the troop instruction, all officers and NCOs in the division received a course of six lectures on gas defense, given by the gas officers. To supplement the lectures, the gas officers had instructions to make full use of AEF Pamphlet 253, "Defensive Measures against Gas Attacks," which had been prepared by the Gas Service in October 1917, a month after the establishment of that service in the AEF.¹⁵ "In this pamphlet," said Lieutenant Wright, "you will find some variations from that in the corresponding British pamphlet. These are intentional variations and not oversights." (He did not describe the variations, and without the British pamphlet they have not been identified.)

The emphasis in the lectures was on the cloud gases, of which "chlorine and phosgene at present are the most important." Not until the fifth lecture was mention made of "the German paralyzant," prussic acid, said to have been used on the Russian front. (The 1st Division was later to use it, in the No. 4 French gas shell.) In that lecture too appeared a brief description of "probably the most important shell gas at the present time...the so-called MUSTARD GAS," with the statement that "probably more casualties have been caused by this gas since its introduction in July of this year than by all the rest of the gases in the war." Mustard gas burns were said to take from three to

15

Standing Trench Orders issued by the regiments and battalions in Feb and Mar all refer to the pamphlet, indicating it was available throughout the division.

five weeks to heal and made a man "practically useless for that length of time." Its least effect on the eyes was loss of vision for from three days to three weeks. The gas also had some effect as a vapor, especially on perspiring parts of the body.¹⁶

What appears to have been the Division Gas Officer's first gas discipline problem centered on the misuse of the gas mask carrier, and a division order was issued making unit commanders responsible that "ABSOLUTELY NOTHING of any sort...be carried in the Gas Mask Satchel except the gas mask."¹⁷ Six months later this order had been forgotten. In a memo to his gas officers, the Division Gas Officer said:

In the satchel of salvaged masks are found everything from clothing to wrist watches. Most of these salvaged masks come from the hospitals and very likely the men were casualties from removing the mask because they could not breathe due to carrying things in the satchel which get under the canister and close the inlet valve.

All Gas Officers should see that the satchel, as well as mask, is inspected and [that] the practice of using the satchel as a carryall is discontinued.¹⁸

Less than two weeks after its exercises in the "defensive and offensive use of gas with actual gas and gas bombs," the 1st Division was pronounced

16

Ltr and atchd synopses of lectures, Ch Gas Off 1st Div to RGOs and BGOs, 3 Dec 1917, sub: Lectures on Gas Defense (Records 20).

17

GO 4, 13 Jan (Records 5).

18

Memo, DGO to GOs, 1st Div, 26 Jun, n.s. (1st Div Box 57, 63.6).

qualified to take its place at the front, and on 7 January received orders to relieve a part of the 1st Moroccan Division in the Ansauville sector, north of Toul.¹⁹ The Ansauville sector was dominated by Mont Sec, a hill held by the enemy which commanded the wooded plain through which the German and French trench works wound their way (see Sketch). The terrain was otherwise fairly level, broken up only by wooded areas and the shell craters of three years of stabilized warfare.

In the Ansauville sector the division came under Passaga's XXII Corps of the First French Army, commanded by General Deben y. Supply functions of the division, however, remained with the embryo I American Corps. Although the relief was completed 18 - 21 January, command of the sector was retained by the adjacent 69th French Division until 5 February, when it passed to the 1st Division.²⁰

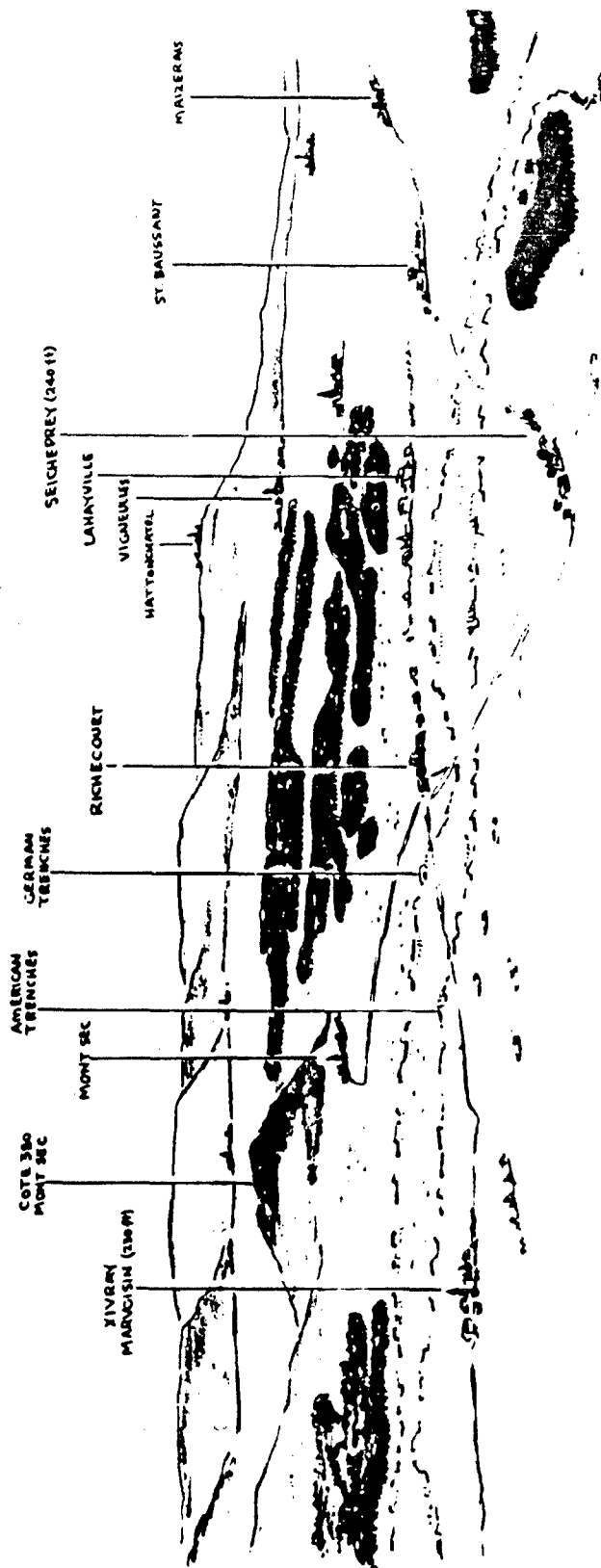
From the point of view of gas warfare, the condition of the 1st Division on arrival in the sector was not auspicious. The 28th Infantry was short 2,600 English respirators and was not to receive them until 5 February. And

¹⁹

18th Inf WD, 10 Jan (Records 16); Hist Sketch, p. 41. On 28 Feb, Pershing was to report it depressing that after ten months there was but one division "just barely ready" for the field. It was 6 Mar before he thought the 1st Div ready at last to take the offensive (My Experiences, I, 334, 338).

²⁰

Memo, Col. Fox Conner, GS GHQ AEF for CofS GHQ AEF, 19 Jan, sub: First Div (Records 1); FO 4, 1st Div, 5 Feb (Records 1).



VUE PANORAMIQUE DU BALLON # 91 - HAUTEUR 1000M

JANVIER 1918

Sketch made over
 the Bois de Juncy
 Source: ADC Int Opns. 17 Feb

the 18th Infantry, which had started out from Gondrecourt with both its French and English masks, had lost or damaged large numbers of them on the march. As 1st Lt. Robert A. Hall, the Regimental Gas Officer, said:

The loss on the march of S.B.R.s & French masks was unusually large. The damage to French masks, due to...getting wet through, despite the fact that the French masks were being worn under the overcoat as required, was unusually large.²¹

It is probable that the experience of the other regiments was similiar.

The division was warned on coming into the sector that a great deal of gas was being used by both sides and that the Germans on this front were using mustard gas, which, in the form of "yperite," was still under development by the French. The troops were told that now that they were in the field it was "of special importance...[that they become] accustomed to wear-[ing] their gas masks for long periods and to march or work with their masks on."²²

The warning was punctuated by a gas bombardment of French artillery positions which the division had just reconnoitered, in which "60 men were

21

Entries in 28th Inf WD, 22 Jan - 5 Feb (Records 17); ltr, RGO, 18th Inf to DGO, 30 Jan, sub: Rpt on Regtl Gas Activities (Records 13).

22

Lt. A. B. Butler (Actg Adj, later Opns O 1st FA Brig, and finally ADC to Gen. Summerall), Jnl of Opns, 12 Jan (Records 11). Hereafter cited as ADC Jnl Opns. FO 1, 1st Div, 14 Jan, par 5(b) (Records 1). The same par in FO 8, 30 Mar, read: "march at quick and double time and work with their masks on." See also Misc Memo, 1st Div, 17 Jan, sub: Mustard Gas (Records 6).

badly burned with 'mustard gas' at position #12 & others were burned at position #16" (Map No. 2).²³ A week later, as the 1st Brigade moved into the trenches, 200 gas cases were seen being evacuated from the Moroccan division to the right of the incoming troops.²⁴

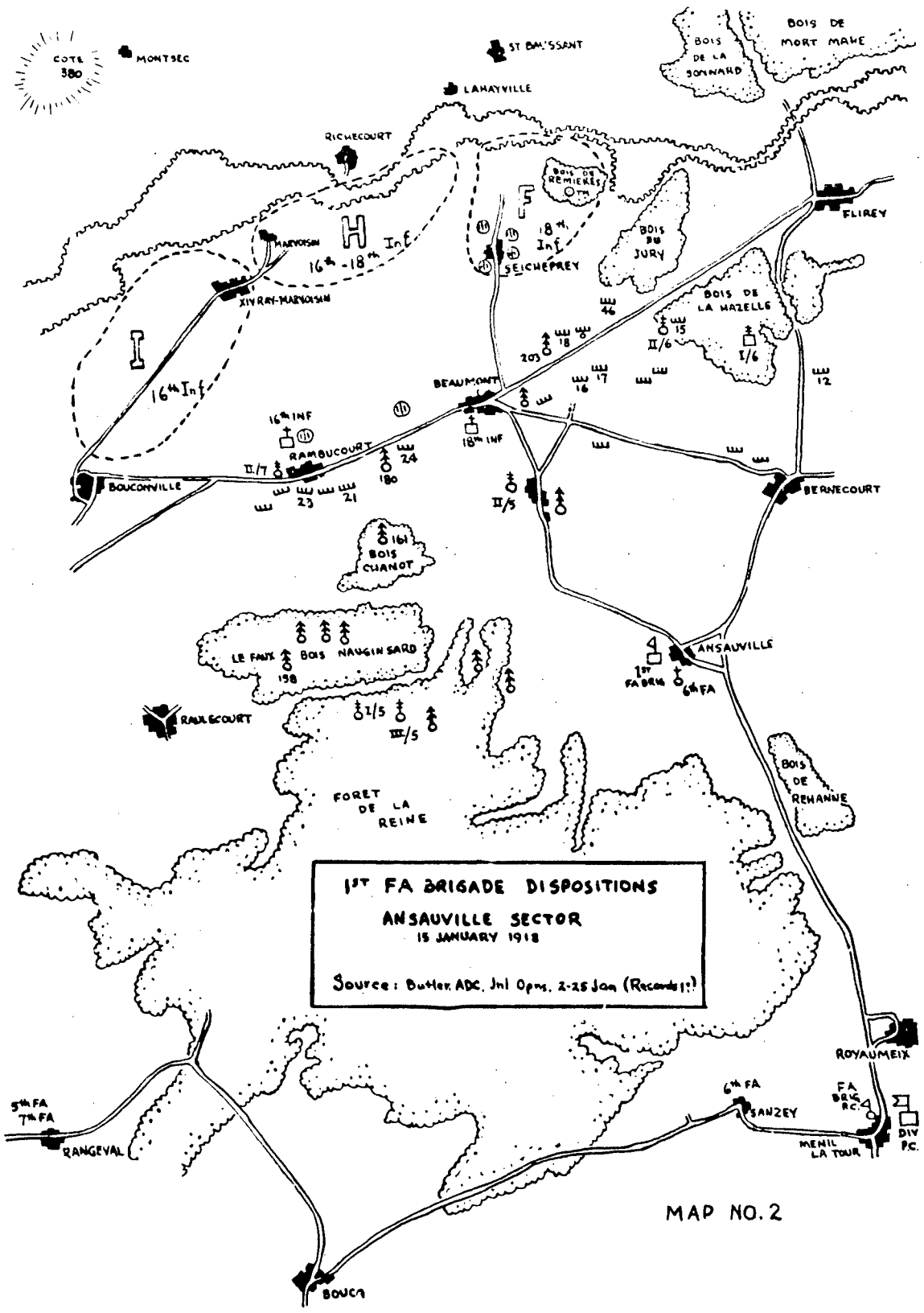
At the direction of the French corps commander, General Passaga, instructions were posted in every dugout and shelter in the 1st Division area on proper procedure during a mustard gas attack. The troops were told to put on the British mask when the first gas shell fell and to keep it on for four hours after a gas bombardment. Anyone passing through a gassed area was to beat and shake his clothes before entering a dugout, and to use soap suds as first aid treatment for liquid mustard on the skin. Further instructions from Passaga in late January were based on recent gas attacks against the 42nd Division, where most of the casualties had occurred as a result of faulty gas proofing of dugouts and of poor gas mask discipline.²⁵

The instructions, however, did not prevent a soldier from washing his hands in a shell hole filled with mustard-contaminated water. He was "badly burned." And as might be expected, the knowledge that Ansauville was a highly active gas front set off a spate of false gas alarms almost nightly in the

²³ ADC Jnl Opns, 16 Jan.

²⁴ Bullard, Personalities, p. 136.

²⁵ Instru 2 and 4, 1st Div, 26 and 31 Jan, sub: Gas Defense (Records 1).



1st FA BRIGADE DISPOSITIONS
ANSAUVILLE SECTOR
 15 JANUARY 1918
 Source: Butler ABC, Jnl Ops, 2-25 Jan (Recon 11)

MAP NO. 2

division sector.²⁶

To the directions in the AEF gas pamphlet that contaminated dugouts and shelters were to be promptly evacuated and that where possible men were to be withdrawn from contaminated areas, a division memo early in February added that all battery units were at once to establish duplicate positions about 500 yards from their first positions and were to withdraw to them when the others were rendered untenable by mustard gas. The memo also repeated much of the earlier instruction on masking and first aid, and pointed out that "Protection is a matter of seconds."²⁷ Still another memo said that gas gloves and chloride of lime would be shortly issued to all artillery, machine gun, signal, and medical units.²⁸ The months at Ansauville were to prove that the artillery rather than the infantry needed the most gas protection. It would be the only time in the experience of the AEF that this was so.

26

Daily Operations Report (DOR), 1st Div, 30 - 31 Jan (Records 12); Memo 6, 1st Brig, 28 Jan (Records 7).

27

AEF Pamph 253, pp. 2, 13 (GHQ AEF Box 1727, fol D); Instru 4, 1st Div, 7 Feb, sub: Def Measures against Gas (suppl'g Reg. No. 253 [revised] GHQ AEF, 30 Nov 1917) (Records 1).

The organization of alternate battery emplacements had been the subject of Memo 21, 1st FA Brig, 23 Jan (Records 9), but may not have been acted on at once. The memo is noted in ADC Jnl Opns, 23 Jan.

28

G - 1 memo, 1st Div, 6 Feb (Records 6).

Artillery Duel

General Bullard's first act upon assuming command of the division sector was to issue instructions saying: "There are no orders which require us to wait for the enemy to fire on us before we fire on him; do not wait for him to fire first."²⁹ The division had been given a small daily allotment of No. 4 (cyanogen chloride) and No. 5 (phosgene) gas shells and had begun to fire them at once. On 1 February almost 80 were fired, probably for registration, and the next day Lieutenant Butler wrote in his journal: "Our 155's fired 174 rounds - mostly gas shells on seven German batteries." This was apparently in reply to 25 phosgene or diphosgene shells, recognized by their "peculiar swish and wobbly sound in passage," that fell harmlessly near the 6th FA in Hazelle woods that day (Map No. 3).³⁰ On 3 February, following a brigade barrage of 6,750 HE shells, Butler reported happily that "the French are very much upset because we fired so long and fast."

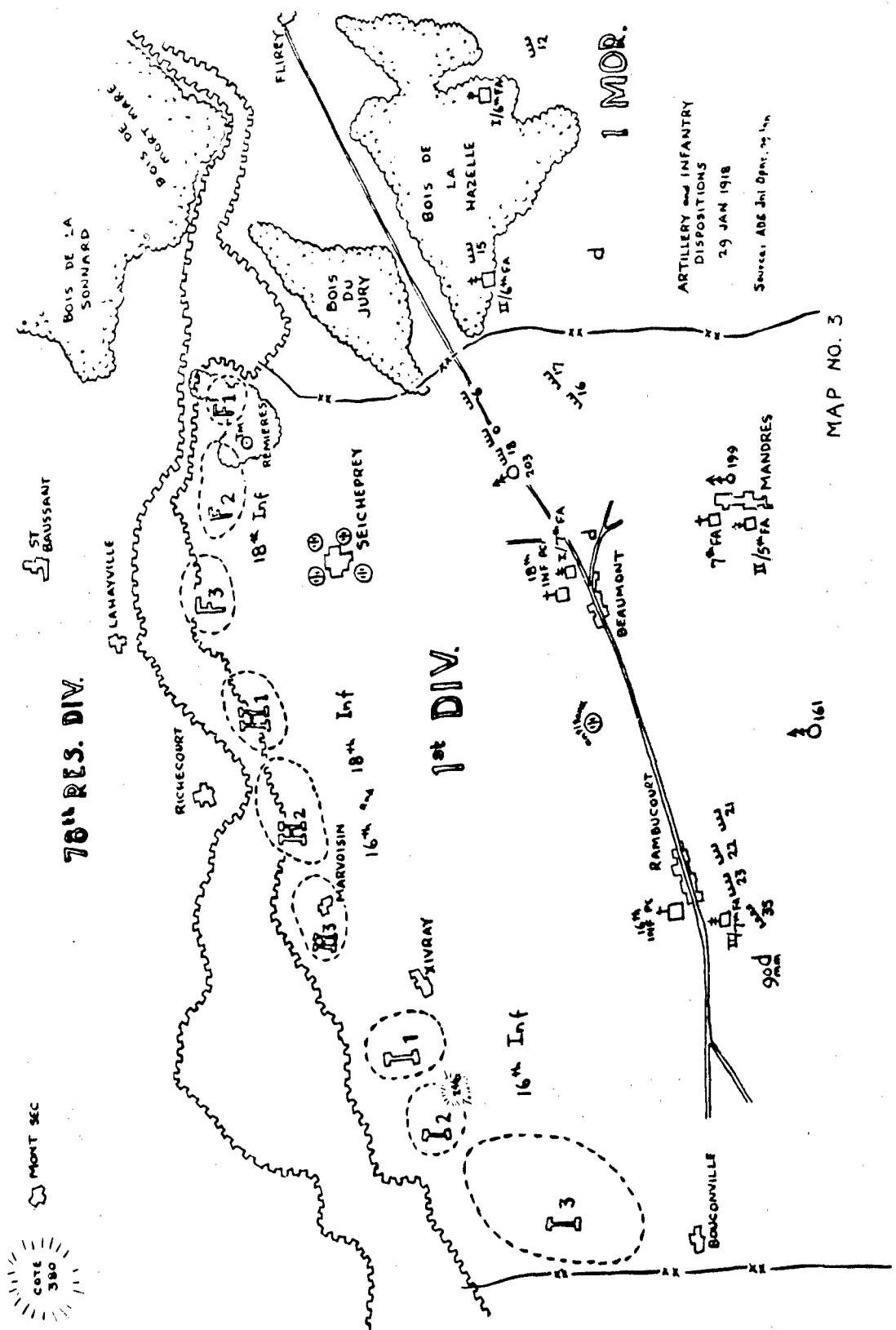
On 5 February, two heavy batteries shelled the enemy gun positions that "we believe were responsible for [shelling #12 position on 16 January]. Gave them plenty of gas. 2nd Bn PC 7th FA at Rambucourt was shelled & gassed

²⁹

Instru 1, 5 Feb, sub: General Instructions (Records 1); Hist Sketch, p. 39; cf. ADC Jnl Opns, 13 Jan.

³⁰

Ltr, RGO 18th Inf to C of Gas Serv, 4 Feb, sub: Rpt of Shell Atk (GAF-1st Div). This is the first gas atk reported by Spencer, "History of Gas Attacks upon the AEF during the World War," I, 1 - 2 (CMLHO).



76th RES. DIV.

1st DIV.

I MOR.

ARTILLERY and INFANTRY
DISPOSITIONS
29 JAN 1918

Source: ABE and Depar. 79 100

MAP NO. 3



[in return]." Battery #12 was shelled again that day, and on 7 February Lieutenant Butler said that as a result "three men from Bty A, 6th FA went to the hospital this morning [with] faces and eyes burned." Upon investigation it was learned that a single mustard gas shell in the HE bombardment had hit a corner of a temporarily evacuated gun pit, soaking its logs. Four men, not three, were subsequently hospitalized.³¹

Under the prodding of 1st Division fire, the artillery of the 78th Reserve Division opposite³² responded in kind, stepping up its fire from less than 100 rounds a day to more than 800 by the end of the month. During March the daily enemy fire was to range between 500 and 1,000 rounds a day, with at least two bombardments of 2,000 or more HE rounds.

The artillery gas duel continued on 20 February and again on the morning of 21 February when "a few gas shells" on a battery northeast of Beaumont on the Beaumont-Flirey road resulted in two casualties.³³ G - 2 failed, however, to report the 75 mustard gas rounds on the same battery on the evening

³¹

ADC Jnl Opns, 2 - 7 Feb; ltr, RGO 6th FA to C of Gas Serv, 10 Feb, sub: Mustard Gas Casualties (GAF-1st Div); Memo 38, 1st FA Brig, 7 Feb (Records 9); Spencer, I, 3.

³²

The 259th Regt, 78th Res Div, was in the trenches opposite the 1st Div. The 78th Res was relieved by the 40th Div on 28 - 29 Mar, according to Daily Intelligence Summary (SOI) that date (Records 4).

³³

SOI and DOR, 20 - 21 Feb.

of 25 February. The Regimental Gas Officer estimated that no more than 60 mustard gas rounds had been thrown over in three HE and gas volleys, most of them going over the position by about twenty yards. Oiled slickers, gloves, and masks were at once put on and there were no casualties.³⁴

The duel suddenly ceased to be anything like equal when on the early morning of 26 February "the enemy delivered a heavy gas attack on the Remieres wood....The suddenness and the violence of the attack, coupled with the overwhelming fumes of the gas, were...horrifying." The commander of the trench mortar battery in the wood said the attack "was very sudden [and] we couldn't tell whether it was HE or gas. It all came down in one burst.... The dugout door was blown in & the gas just rolled in."³⁵

This was a enemy projector attack, originally intended to climax three nights of artillery shelling with 1300 rounds of unspecified gas, in preparation for an elaborate raid under the code name of "Einladung." Following the projector shoot, long range artillery planned to gas the southern half of the Bois de Remieres with blue cross (diphenylchloroarsine) shell,

³⁴

Hanslian, "Gasangriffe an der Amerikanischen Front," pp. 67 - 68 (CMLHO); 78th Res Div WD, 25 Feb (World War Records, First Division, German Documents, Vol. I). Unless otherwise noted, all references to German documents will be to this volume. See also ltr, RCO 5th FA to C of Gas Serv, 27 Feb, sub: Gas shell bombardment (GAF-1st Div); ADC Jnl Opns, 25 Feb, said the shells fell near btys #203 and #18 - "no harm done."

³⁵

Hist Sk, p. 42; quote in ADC Jnl Opns, 27 Feb.

"to effect gas alarms and reduce the combat efficiency of the enemy," while minenwerfers put down a three-minute fire wave. The surprise raid, simultaneous with the fire wave, was to be made at daybreak.³⁶ Only the projector attack was carried out; the raid for some reason was deferred until 1 March.

On the morning after the attack, G - 2 reported that "about 70 bombs, 210-mm, chlorine and phosgene," had been launched between 0132 and 0145 from trench mortar projectors sited west of the Bois de La Sonnard. G - 3 agreed with the estimate of 70 bombs and suggested that they had been fired in retaliation, "as we have on two or three occasions fired gas at them and have unquestionably touched them up quite a bit more than they have been before in this sector for a long time."³⁷

A more accurate estimate was General Bullard's report that two volleys, each of 100 18-cm minenwerfer shells, eighty percent of them phosgene, had crashed "with a loud explosion and bright flare of light" in the Bois de Remieres and in the trenches west of the wood (Map No. 4).³⁸

³⁶

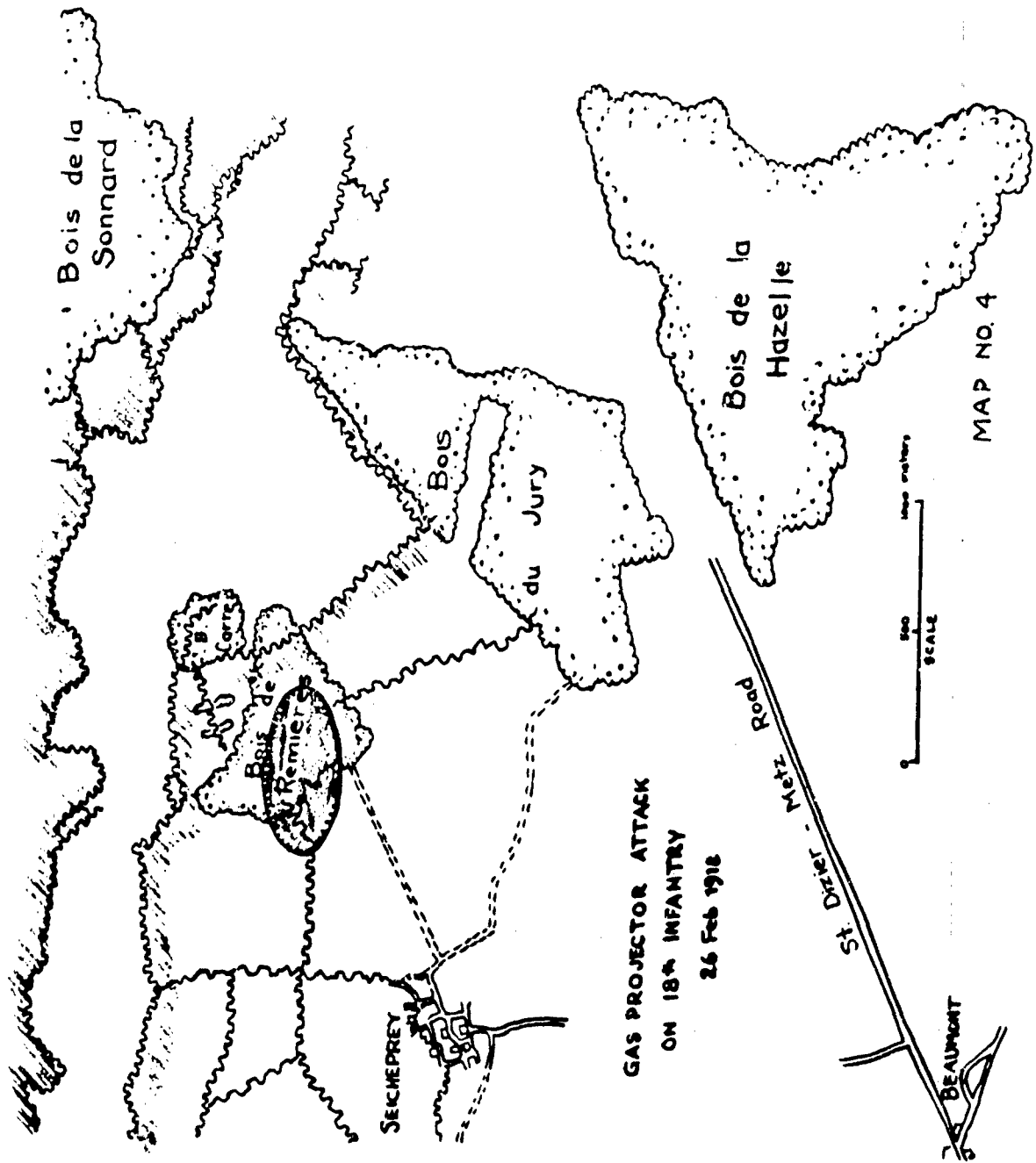
Arko 78 WD, 17 Feb; 78th Res Div Order [for Einladung], 22 Feb; 78th Res Inf Brig Order, 25 Feb.

³⁷

SOI and DOR, 25 - 26 Feb. These "trench mortar projectors" were the German version of the British Livens Projector, first used in a gas attack in April 1917. The German projector reached the field that December.

³⁸

Ltr, CG 1st Div to CG XXXII Corps, 27 Feb, sub: Gas Attack (Records 12).



GAS PROJECTOR ATTACK
 ON 18th INFANTRY
 26 Feb 1918

Hanslian and 78th Reserve Division records indicate a much larger gas shoot. Of 810 projectors loaded with phosgene flasks, 10 with the new German gas, diphenylchloroarsine, and 80 with high explosive, 807 were launched in the first salvo at 0235 and 42 in the second salvo at 0320. The mission, to produce casualties with almost 14 tons of phosgene,³⁹ had been carried out on a clear, cold night by the 35th Pioneer Battalion, against the dugouts and supply rail lines in the Bois de Remieres. Observing the great white cloud that formed over the Bois de Remieres and then settled down on the wood, the 35th Pioneers believed the attack a success. But Hanslian, on the basis of records available to him, which indicated that the wood was sparsely occupied at the time, considered the attack a failure.⁴⁰

German reports that two 1st Division batteries were gassed with yellow cross on the morning of the projector attack and three more "very effectively gassed" the next morning, 27 February, are not confirmed by the division.⁴¹

Total casualties as a result of the projector attack were reported by G - 2 as 3 killed and 9 "injured." There were no corrections to this report.

³⁹

Eight hundred of the standard 18-cm minenwerfer bombs, with 16.49 pounds of phosgene each, would total 6.6 tons, not 14.

⁴⁰

Hanslian, pp. 8 - 16; 78th Res Div WD&A records; Spencer, I, 6 - 23. A month later SOI and DOR, 20 - 21 Mar, quoted a prisoner as saying that 900 projectors had been fired, about half of which fell in their own lines, keeping them out for two days. If true, this would explain the difference between Bullard's and Hanslian's shell counts.

⁴¹

78th Res Div WD, 26 - 27 Feb.

The commander of the 3rd Battalion, 18th Infantry, in Remieres Wood, said that the time between the first flash and the gas release was so brief that many of the men inhaled the gas before they could adjust their respirators. Most of the second salvo landed among his reserve platoon and in the trench mortar area in the woods where the men were in their dugouts and were not on the alert. At daylight, the battalion medical officer reported one man dead, an officer and an enlisted man severely gassed, and 20 others slightly gassed, but this total did not include the machine gun company, trench mortar or artillery details in the area. It was believed that their casualties were heavier than those among the infantry.⁴²

The 1st Brigade War Diary that day reported 3 dead and 8 men severely gassed because they failed to get their masks on quickly enough, and 28 other gas casualties as a result either of removing their masks too soon or eating food impregnated with gas. The G - 3 daily report said that during the day casualties increased "until 61 cases have been reported. Seven are dead and there will probably be two or three more."⁴³ There would have been half as many casualties, said General Bullard, except that some of the NCOs let the men remove their masks a half hour after the last shell fell, and

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SOI, 25 - 26 Feb; ltr, CO 3rd Bn Inf to CO 18th Inf, 26 Feb, sub: TM Gas Shell Barrage (Records 13).

⁴³

1st Brig WD, 26 Feb (Records 16); DOR, 25 - 26 Feb.

after daylight men were permitted to work in the area without masks. They continued to work unmasked even though the odor of phosgene was strongly in evidence in the woods as late as 48 hours after the attack.⁴⁴

The medical history of the division, reporting this as "the first German gas attack on U. S. troops, " said that 62 gas cases were admitted to the hospital, with four deaths among them later.⁴⁵ The final count of casualties was reported by the Division Surgeon, who said that 2 men died in the field and 83 were evacuated. Of those evacuated, 6 died within five to sixty hours after reaching the gas hospital at Menil la Tour. There were approximately 230 men in the area at the time, chiefly in the trench mortar battery and Company K, 18th Infantry.⁴⁶

In a supplementary report, the commander of the 3rd Battalion described the panic that had seized some of his men following the initial salvo of bombs. One man in panic stampeded and knocked down two others adjusting their masks. He rushed down the trench screaming and made no attempt to put on his respirator. He died shortly after reaching the dressing

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Ltr, CG 1st Div, 27 Feb, above, and ltr, BGO MG Bn 1st Brig to CO 1st Brig, 28 Feb (Records 15).

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MS. Hist of Med Dept, 1st Div, 14 Jan 1920 (Med Dept Box 3398, fol 1). The error is perpetuated in Medical Department of the U.S.A. in the World War, vol. III, Field Operations (Washington, 1925), p. 294.

⁴⁶

Ltr, Lt. Col. H. G. Shaw to Ch Surg AEF and Ch Surg 1st Fr Army, 1 Mar, sub: Gas Attack (Med Dept Box 3398, fol 8).

station. Another man threw himself in the bottom of the trench and began to scream. Two others trying to adjust his respirator had their own pulled off and were gassed. He was finally carried out of the area but died not long after. Another private couldn't find his respirator and became panic-stricken. When it was found and finally adjusted, he claimed it was broken and changed into his French mask, breathing in gas while he changed. On the way to the dressing station he repeatedly pulled the French mask away from his face and breathed the gas laden air, and died shortly after reaching the station. An officer was gassed while shouting to the men to keep their respirators on.

There was no doubt, Lt. Col. R. H. Griffiths concluded, that a large number of the gas cases that developed some time after the attack were the result of failure to observe well-known precautions, and he pointed to the fact that rice for breakfast that morning was allowed to stand exposed for several hours in the trench before being eaten. He ordered this report on the failure of gas discipline to be read to all companies of the battalion.⁴⁷

On 28 February, a division memo said that men who had become casualties ten to fifteen hours after the attack were those who had not got their masks on quickly enough, had changed to the French mask, or had removed their

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Ltr, CO 3rd Bn to CO 18th Inf, 27 Feb, sub: Suppl Rpt on TM Bombardment in Center F (Records 13 and 1st Div Box 76, 33.6). Note: They may be typographical errors but Lecture 4 in the lectures on gas defense (Records 20) specifically said that both food and water exposed to cloud attack gases might be used.

masks a few minutes after the attack ended. Henceforth, troops in the alert area were to wear the British mask at the alert position at all times, even while sleeping, and were to change to their French mask only when the British mask "became torn or punctured, and as a last resort."⁴⁸

On the day after the bombardment of the 18th Infantry, the 16th Infantry cautioned its troops that they might be next on the German pioneer schedule. French Intelligence, issuing this belated warning of the presence of the pioneers, described the patterns of enemy minenwerfer emplacements for such gas cloud shoots and the tell-tale signs, "a sea of fire and large amounts of smoke in the enemy lines," that signaled the discharge of the projectors.⁴⁹ Although the 35th Pioneers had planned a second attack on Flirey following that on Remieres, it was not made, and after digging out their projectors they left the sector.⁵⁰

Determined not to be caught by such an attack again, the division during the rest of its stay at Ansauville made continuous efforts to spot projector installations and neutralize them before they could be completed.

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G - 3 Instru 18, 1st Div, 28 Feb, sub: Gas Defense (Records 1).

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Doc 98, Hq 16th Inf (1st Div Box 70, 32.15).

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SOI and DOR, 20 - 21 Mar, quoted a prisoner as saying that in digging out the misfires, a blind shell exploded, killing 10 and wounding 30. 78th Res Div and 78th Res Brig War Diaries, 3 Mar (sources a and k, German Documents), report 12 killed, 26 wounded and 7 killed, 30 wounded, respectively, as a result of the exploding shell.

On 28 February, said Lieutenant Butler, the heavy batteries fired for an hour on an area where gas cylinders or projectors were believed to be sited. On 4 March, G - 3 reported sounds above the Bois de Remieres resembling the emplacing of projectors and a bombardment was called for at once. On 9 March, 484 155-mm rounds of HE were put on a target below St. Baussant on what was thought to be a projector site. (Similarly, the enemy fired 400 HE rounds into the trenches west of Xivray on 9 March where the mounting of American gas projectors was suspected.)

On 10 March, sounds like the construction of either trench mortar or gas projector emplacements was heard in the Bois de la Sonnard and silenced, and two days later an allied plane observed three parallel trenches just east of St. Baussant that resembled gas projector emplacements. All guns of the division fired a concentration on a supposed site on the evening of 14 March and other suspected emplacements were shelled on 17 and 19 March. The projector attack of 26 February was well remembered.⁵¹

Gas for Raids

It was in preparation for one of the many raids carried out by both sides on the Ansauville front late that winter that at 0530 on 1 March

51

DOR, 3 - 18 Mar; ADC Jnl Opns, 28 Feb, 19 Mar; telg, Col King CofS 1st Div to Col. Conner G - 3 GHQ AEF, 9 A. M., 9 Mar (Records 12); 78 Res Div WD, 9 Mar.

there suddenly came down upon the right sub-sector, held by the 18th Infantry, a tornado of bursting shells and bullets and every battery was deluged with high explosive shell and mustard gas....Trenches, parapets, shelters and emplacements were demolished...some so completely that they were never rebuilt.⁵²

This vivid description is not supported by G - 3 so far as gas is concerned, and G - 2 reported only between 700 and 950 HE shells on the Bois de Remieres and Bois du Jury that morning. Yet the 6th FA said that several of its batteries were heavily bombarded that morning with HE, mustard gas, and phosgene, though there were no gas casualties. The trench mortar battery in Remieres escaped the attack, said Lieutenant Butler, since it "was not in its place because of the way it was knocked up in the gas attack of Feb. 27th."⁵³

The G - 3 daily report of casualties showed 24 killed, 30 wounded, and 2 gassed on 1 March, with two-thirds of the killed and wounded occurring in the German raid that followed the bombardment. The War Diary of the 78th Reserve Division said nothing about gas, but only that it had bombarded the trenches north of Remieres with 720 HE projector shells prior to its raid. The raid by four assault companies was frustrated by the "weak occupation of enemy position...considering the number of dugouts." Nevertheless, two machine guns and 13 prisoners from the 18th Infantry were brought back, at a

52

Hist Sketch, p. 44.

53

SOI & DOR, 28 Feb - 1 Mar; ltr, RGO 6th FA to CofGas Serv, 2 Mar, sub: Gas shell bombardment (GAF - 1st Div); ADC Jnl Opns, 1 Mar; Spencer I, 24.

cost to the raiders of 5 killed, 59 wounded, and 12 missing.⁵⁴

Although the raid on 1 March and a bombardment with 3,000 HE shells on the Bois de Remieres and Bois du Jury on 3 March were jarring, they did not stop 1st Division plans for two raids of its own on 4 March. A total of 173 guns, including French auxiliary batteries brought in for the raid, began the preparatory fire on the German batteries, with "about half the shots gas." Over 5,200 75-mm, 1,400 175-mm, and 650 trench mortar, 90-mm and 95-mm rounds had been fired, principally in the Lahayville and St. Baussant sectors, when the dawn raid by the 1st Brigade was called off and plans for the evening raid were abandoned. The Engineers had started too late that morning, got lost, and had failed to cut the enemy wire with their bangalore torpedoes.⁵⁵

The 78th Reserve Division seems to have been aware only of the gas shells fired in this preparatory bombardment, for it reported that from 0200 to 0300 between 6,000 and 7,000 gas rounds had been fired on its battery positions

54

259th Res Regt, Rpt to 78th Res Brig, 1 Mar, sub: Einladung raid;
78th Res Div, Rpt to Hq 38th Res Corps, 3 Mar (78th Res Div WD&A). Almost 100 pages of data are given to this raid in the German Documents.

55

SOI, 3 - 4 Mar; ADC Jnl Opns, 3 & 4 Mar. Lt. Butler reported the great humiliation of the division in the eyes of the French, of General Pershing who had come especially to see the raid, and indeed in "the eyes of the whole world."

and rear areas. Casualties were not reported.⁵⁶

The German estimate of gas shells may not have been greatly exaggerated, even though it would mean that much more than half the reported shots (i.e., 3,625) were gas. They may actually have totaled almost 6,000. While denied in a postwar artillery summary of special shells fired by the brigade, which shows a total of only 297 155-mm No. 4 and No. 5 shells fired on 4 March, the Operations Officer of the brigade said that "considerable gas was used for neutralization in a raid in the Ansauville sector early in March, records of which were not retained."⁵⁷

Three days later, at 1818 on 7 March, G - 2 reported an enemy bombardment of batteries in the Bois de la Hazelle and on the Rambucourt-Beaumont road with approximately 150 gas shells, followed by a repeat shelling with 120 gas shells at 1100 on 8 March. The 78th Reserve Division said that a total of 684 77-mm and 105-mm yellow cross shells were fired during the two Wirkungsschiessen (fires for effect), at 1800 and midnight, 7 March.⁵⁸

56

78th Res Div WD, 4 Mar; 78th Res Brig WD, 4 Mar (source d).

57

There is evidence that 5,973 gas shells were fired in the 4 Mar preparation. See ltr, CG 1st FA Brig to CG 1st Div, 12 Mar, sub: Rpt upon Opns...11 Mar; rpt, Special Shells fired...Jan - Nov 1918, sub: Offensive Use of Gas by 1st FA Brig (Records 14).

58

SOI, 7 - 8 Mar; 78th Res Div WD, 7 and 8 Mar; Hanslian, p. 69.

The gas officers of the 5th and 7th FA recorded a total of 280 mustard gas shells in the two bombardments, those on the 5th FA bracketing the gun positions. Except that all rations for the noon meal on 8 March had to be condemned, no harm was done and the regiments had no casualties to report. Whether he was an artilleryman or infantryman, G - 3 did not say, but the only gas casualty recorded that day was a man who fell into a contaminated shell hole.⁵⁹

The frequency of the gas shelling of the batteries resulted in an order that day that rubber boots, anti-gas gloves, and anti-gas suits for each man were henceforth to be kept at all battery and machine gun positions and at artillery command posts, and were to be provided for all stretcher bearers and signal linemen in the division.⁶⁰ This became standard equipment also for French artillerymen with the division, who later reported that they were equipped with the M-2 and ARS masks, American rubber boots, oilskin jumpers, and mittens, as items of individual protection, and chloride of lime, soapy water, and bicarbonate of soda for collective protection.⁶¹

59

Ltr, RGO 5th FA to C of Gas Serv, 8 Mar, sub: Gas shell bombardment; ltr, RGO 7th FA, 9 Mar (GAF-1st Div); ADC Jnl Opns, 7 and 8 Mar; Spencer, I, 25 - 28. Note: Since hospital admission lists for this period have not survived, daily casualties cannot be checked. Data in the Analysis indicate many more gas and wound casualties than are revealed by the records used in the narrative.

60

Instru 20, 1st Div, 7 Mar, sub: Anti-gas equipment (Records 1).

61

Rpt on opn at Cantigny, VIII Gp, 177th Fr Trench arty, 2 Jun (Records 14). The Appareil Respiratoire Speciale or ARS mask was a late development by the French. It was comfortable to wear but complicated to make and was in short supply.

The raids planned for 4 March were finally carried out on the morning and afternoon of 11 March, despite the fact that for 24 hours preceding the morning raid...the position of Battery D and Headquarters, 2nd Battalion, 2nd Battalion, 6th Field Artillery [in the Bois de la Hazelle] was kept under a concentration of mustard gas, mingled with high explosive shellsNevertheless, the men served the guns, wearing their gas masks, during both raids. At the end of the evening raid, all officers and men were overcome by the gas and were evacuated. A completely new personnel, dressed in rubber clothing and gas masks, moved the guns during the night to a new position.

In the same gas attack the position of Battery A, 7th Field Artillery, also was "so heavily and continuously shelled and gassed that...it was necessary to move that battery" too.⁶²

Available records of the 78th Reserve Division say only that on 10 March two of their batteries were shelled with gas and in exchange they shelled an enemy battery with yellow cross. Hanslian reports data indicating that the attack on the battery in Hazelle woods was carried out by 78th Reserve Division artillery between 1800 - 2000 with 421 yellow cross and green cross 102-mm shells.⁶³ There is no evidence of a bombardment lasting for 24 hours.

Lieutenant Butler wrote in his journal on 11 March:

Although #15 [Battery D] was gassed heavily last night & the personnel... withdrawn, they returned for the coup de main [in the morning] & served their guns with their gas masks & gas clothes on....[In the evening] gas was still pretty thick around #15....After the evening raid everyone in #15 [was] withdrawn [to Ansauville] except a sentinel at each gun....Guns will be moved to the gas position in the morning.

⁶²

Hist Sketch, p. 48.

⁶³

78th P : Div WD, 10 Mar; Hanslian, p. 70.

The 6th FA gas officer said that almost 600 phosgene and mustard gas shells fell around the battery in the Bois de la Hazelle and on the night of 10 March 2 officers and 18 men were evacuated, most of them with acute conjunctivitis as a result of taking their masks off too soon.⁶⁴ There were to be many more casualties, for the officers and men remained in the gassed area, ignoring the presence of the mustard gas that had been fired with the phosgene.

Just how effective this mustard gas was is evident from Butler's entry of 12 March:

The guns in D Bty were moved [today] from #15, which is still full of gas, to position #87. Seven officers and 50 men are in the hospital with burned eyes, all from D Bty. (Two gas officers, a doctor & battery officers & officers from 2nd Bn, 6th FA. Hdqtrs.)....2nd Bn, 6th FA Hdqtrs have been moved.

On 22 March he added: "Position #15 is still unoccupied & the enemy seems to know because he doesn't shell it any more." The enemy apparently had a tap on the line into #15, said Butler, for on 20 March, hearing two telephone men testing the wire there, he had immediately put gas on the position and both men became casualties.

The reported gassing of the 7th FA battery in the bombardment seems to have occurred on the evening of 11 March, when 50 mustard gas shells were landed in the rear of the battery position. This may have been the "burst of gas on the [battery] position in the southwest portion of Hazelle Wood,"

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Ltr, RGO 6th FA to C of Gas Serv, 11 Mar, sub: Gas shell bombardment (GAF-1st Div); Spencer, I, 29.

which the German division said it fired at 2100 on 11 March, and was more likely some form of green cross (phosgene or diphosgene) rather than yellow cross gas. The artillerymen, though masked, were said to have been affected by the fumes for two and a half hours, after which the effects wore off. All those exposed then washed with soap suds and bathed their eyes with salt water. There were no casualties and no mention of evacuation of the position.⁶⁵

Returning to the raids on 11 March, which were made by 60 men from the 18th Infantry above Remieres wood that morning, and by 60 men from the 16th Infantry against Richecourt in the evening, G - 2 said that "at 5:50 a.m. our artillery dropped a heavy bombardment and barrage on salient Remieres... [including] gas shells...into Lahayville at 5:55." With the auxiliary French batteries back in position for the raids, over 32,000 shells were fired on 10 - 11 March as the artillery, instead of the Engineers with their torpedoes and petards, was used to cut four gaps in the wire. "All firing on the enemy's batteries was executed with gas shell, and three of the light batteries fired gas shell on the positions at St. Baussant and Lahayville throughout both raids." The raiders both in the morning and evening forays were said to have stayed about twenty minutes in the enemy salients and in

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Ltr, RGO 7th FA to C of Gas Serv, 12 Mar, sub: Enemy gas shell bombardment (GAF-1st Div); Spencer, I, 30; 78th Res Div, Morning rpt, 12 Mar (item 546); 78th Res Div WD, 11 Mar.

both cases returned without prisoners.⁶⁶

Although they reported seeing a patrol of 30 men, the Germans seem to have been wholly unaware of these raids, but thought a full-scale attack had been planned which had been broken up by their annihilation fire. The "strong torrential fire on Lahayville, St. Baussant, Sonnard Woods and the rear areas" that morning had been of more concern and was estimated at 10,000 - 12,000 rounds. The 155-mm gas shells were mistaken for trench mortar gas shells. "The gas was strong, tear-producing, and so dense in St. Baussant that one could see for not more than a distance of three meters." In the evening the deadly fire was repeated, with an estimated 6,000 rounds. "In the main the enemy used gas ammunition....The reason of the enemy fire has not been determined." Casualties as a result, presumably, of the two bombardments were said in the evening report of the 78th Reserve Division to be 6 wounded and 10 gassed, but the War Diary showed 2 killed, 15 wounded, and 22 gassed that day.⁶⁷

According to a report of special shells fired by the 1st FA Brigade, these gas casualties were caused by 2,066 No. 5 (phosgene), including some

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SOI, 10 - 11 Mar; itr, CG 1st FA Brig to CG 1st Div, 12 Mar, sub: Rpt upon Opns...during raids executed Mar 11 (Records 14); ADC Jnl Opns, 11 Mar.

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78th Res Inf Brig, Advance Rpt, 11 A.M., 11 Mar (item 528); 78th Res Div, Evening rpt, 11 Mar (item 538); 78th Res Div, Morn rpt, 12 Mar (item 516); 78th Res Div WD, 11 Mar.

proportion of No. 4 (cyanogen chloride), shells fired that morning, and 2,345 No. 4 and No. 5 shells in the evening.⁶⁸ In addition, 850 smoke shells were fired in the box barrage for the morning raid and another 850 that evening, for a total fire of 4,411 gas shells, 1,700 smoke shells, and 32,000 HE. If the German casualty data are to be believed, it was an enormous expenditure for small results.

The continuing artillery duel is evident in Arko 78 reports that bursts of nonpersistent gas as well as yellow cross gas were put on 1st Division batteries on 15, 16, and 17 March. The division reported 4 gas casualties on 17 March only. German records, however, do not confirm their "large number of gas shells...fired into the Bois de Remieres about 4 a.m." on 19 March, not the "new departure" recorded that day when a hostile airplane "dropped several rubber balls 18-inches in diameter and filled with liquid mustard gas in I-2 [Hill 246]." There appear to have been no casualties resulting from either event.⁶⁹

Another unusual occurrence happened on 23 March when at 11 p.m. an airplane was observed at great height to shut off his motor, volplane [i.e. glide]

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Rpt, Spec Shells fired by 1st FA Brig, Jan - Nov 1918, n.d. (Records 14). The 2,066 gas shells comprised 990 155-mm and 80 75-mm shells fired by the brigade and 996 75-mm shells fired by the atchd French artillery. The 2,345 gas shells comprised 992 155-mm, 357 75-mm, and 996 75-mm shells.

⁶⁹

Arko 78 WD, 15 - 17 Mar; SOI and DOR, 18 - 20 Mar; ADC Jnl Opns, 21 Mar.

and throw out over the Beaumont-Jury road bombs which exploded in the air, giving out a reddish-blue cloud which came down and spread. It is believed to be gas.

G - 3 reported it as "a cloud of mustard gas." Two days later the division said: "This report has been verified until it seems to be a fact."⁷⁰

The First German Spring Offensive

The airplane attack with gas occurred during a series of daily mustard gas attacks on Seicheprey from 21 - 25 March, when, according to Hanslian, a total of 1,325 77-mm and 105-mm yellow cross shells were fired in hour-long attacks on the village. In the late afternoons or evenings of each of those days, amounts ranging between 160 and 350 gas shells were fired on the troop dugouts in Seicheprey and southeast of the village.⁷¹ It was part of the demonstrations taking place all along the Western Front, in conjunction with the first of the great German offensives in the spring of 1918, and was the only time a village in the 1st Division sector was gassed.

For almost a month previous to the German assault at Arras on 21 March,

70

SOI and DOR, 23 - 24 Mar; ltr, King CofS 1st Div to Conner, 9 A.M., 25 Mar (Records 12). Neither the gas balloons nor gas bombs seem to have caused any casualties.

71

Hanslian, pp. 71 - 72, says they began on 21 March. 78th Res Div records show only that on 22 Mar "our btys shelled...the dugouts at the southeast exit of Seicheprey with 350 rounds of yellow cross," and on 23 Mar "we shelled dugouts in Seicheprey with yellow cross."

the 1st Division had been on the alert as warnings were issued that the enemy was conducting "maneuvers of rupture" preparatory to a sudden offensive somewhere on the Western Front. "Harassing fire on trenches, communications, PCs, OPs, and artillery emplacements, especially with gas shells, can be expected for days preceding as well as immediately before the assault."⁷² But the 1st Division, harassed and harassing in return almost daily, did not recognize the demonstration for the offensive.

The offensive began on the morning of 21 March when 64 specially trained German divisions, after a short artillery preparation with an unusually high proportion of gas shells (estimated at 200,000 to 250,000 blue and green cross shells) attacked the Third and Fifth British Armies between the Oise and Scarpe rivers on a 40-mile front from Arras to La Fere (see Map No. 1). By the end of the fifth day, the British had lost more than 150,000 men and the Germans had driven a 37-mile salient almost to Amiens, the capture of which would probably have separated the British and French armies. On 28 March, as the British armies rallied, the French made a furious counterattack at Montdidier, the point of deepest penetration, but could not retake the city. The German advance, however, had been brought to a halt.

Three days before, on 25 March, with the shattering of the allied lines on the Western Front apparently a matter of days, Pershing met with Petain

72

Instru 15, 1st Div, 27 Feb, sub: Provision for all alerts; Instru 23, 11 Mar, sub: Orders in case of Corps Alert (Records 1).

at Compiegne and put at his disposal all the American forces in France, to take their place in the battle line or to be used to relieve French divisions for the battle.⁷³ The result was an order for the relief of the 1st Division in Lorraine. It was to proceed at once to Picardy, where the battle was then raging.⁷⁴

Meanwhile, the 1st Division waited out the repercussions of the battle to the northwest. Capt. Louis S. Davis, who replaced Lieutenant Wright as Division Gas Officer on 20 March, did not report the gas attack on Seicheprey on 21 March, but said that 650 mustard gas shells fell in the village on the afternoon and evening of 22 March, that another attack was made with 200 shells on 23 March, and 250 more on 24 March - a total of 1,100 mustard gas shells. As of the 25th, there had been 19 men evacuated, all from the first attack. The attack on 24 March had resulted in no casualties "except a few eye cases" [sic].⁷⁵ Whether any of the casualties occurred among the 800 replacements that were being equipped and trained in gas protection during the week of the gas attacks on Seicheprey, Davis did not say.

Although there is no evidence that Seicheprey was evacuated following

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My Experiences, I, 353 - 356, 364 - 365.

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FO 6, 1st Div, 28 Mar; FO 8, 1st Div, 30 Mar; Hist Sketch, p. 51.

⁷⁵

Ltrs, DGO 1st Div to CGO I Corps, 25 Mar and 31 Mar, sub: Weekly Narrative Rpt (GAF-1st Div).

the first attack, Hanslian assumed that it must have been, in view of the few reported casualties, or else that much of the gas thereafter had fallen outside the town.

G - 3 reported the shelling of Seicheprey on three nights only in the period 21 - 25 March and indicated that the 20 gas casualties it reported had all resulted from the first bombardment with over 600 mustard gas shells on the evening of 21 March. G - 3 showed no casualties from the bombardments it reported on 24 and 25 March. G - 2 reported a single shelling of Seicheprey in the period, on 23 March. There was little agreement between G -2, G - 3, and the DGO on the shelling and no recognition of a pattern.⁷⁶

Lt. Col. Hanson E. Ely, commander of the 28th Infantry, whose troops were in the Seicheprey area at the time, said nothing of the gas attack on 21 March but reported that approximately 450 mustard and chlorine shells had fallen in the area on the early evening of 22 March, causing 17 serious casualties. He was considerably exercised about the inability of the artillery to protect his men. When the gas shells began falling he called for retaliation fire but neither the gas nor the HE that had been fired had been sufficient to still the German batteries. His artillery liaison officer informed him "that it is very difficult for the artillery to get gas shells, and the amount they have on hand is not sufficient for a gas bombardment of this kind." Colonel Ely asked that more gas shells be obtained, to put the

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DOR and SOI, 21 - 26 Mar; cf. Spencer, I, 34.

division "on a par with the French and English for protection against such gas shell bombardments."

Queried by General Bullard, General Summerall pointed out the difficulty of silencing the German batteries. There were 56 of them against his 21 then in action. Even had sufficient gas shell been available, he said, up to noon on 23 March "the weather was favorable for emission of enemy gas; hence it was not favorable for our gas." In one 24-hour period, the enemy batteries had fired 720 shells [including gas shells?]. He had fired 1,390 shells, "including 600 retaliation." But on the afternoon and evening of 23 March, when meteorological conditions became favorable, said General Summerall, his artillery had put 400 gas shells on St. Baussant, Lahayville, and Camp de la Schlucht, a cluster of enemy dugouts east of Maizerais.⁷⁷

The postwar summary on the use of special shells indicates that 171 gas shells were fired on a number of enemy targets on 21 March, 70 on 22 March, but with favorable weather, 70 155-mm and 559 75-mm gas shells were fired on 23 March and another 517 75-mm gas shells on 24 March.⁷⁸ While these widely scattered "gas concentrations" with nonpersistent gases put down by the brigade may have harassed the enemy, they were not likely to

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Ltr and inds, CO 28th Inf to CG 1st Div, 23 Mar, sub: Gas Shells (Records 13); DOR, 22 - 23 Mar; ADC Jnl Opns, 22 Mar, reports the gas retaliation that night, not 23 Mar.

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Rpt, Spec Shells fired by 1st FA Brig, Jan - Nov 1918 (Records 14).

produce large numbers of casualties, particularly when any quantity of No. 4 (cyanogen chloride) shell was used. No. 4 gas tended to flash on burst and disintegrate.

Major Gas Attack

The 1st Division was still in Lorraine when it suffered its first major gas attack.⁷⁹ Between the hours of 2130 - 0030 on 28 - 29 March, G - 2 reported that 1,000 HE, gas, and incendiary shells were fired on Rambucourt, in an attempt to neutralize four batteries there. The 6th FA said that 400 to 600 phosgene and mustard gas shells had fallen on six of its batteries in the surprise gas bombardment. Three officers and 11 men were evacuated. These may have been from the squad reported by Lieutenant Butler to have taken off their masks because they were too warm. Their sergeant, who had been "mentioned before for coolness under fire, will be tried as soon as he gets out of the hospital."⁸⁰

79

GO 25, First Army, 15 Oct (89th Div Box 148), defined a major mustard gas bombardment as "2,000 or more 75 caliber shell, or equivalent quantities of mustard gas in other calibers." No similar definition has been found for non-persistent gas bombardments. A total of 10,000 gas shells is arbitrarily assumed to be a major non-persistent gas attack.

80

Ltr, RGO 6th FA, to C of Gas Serv, 29 Mar, sub: Gas shell bombardment (GA^F-1st Div); ADC Jnl Opns, 29 Mar; ltr, CO 1st Bn 6th FA to CO 6th FA, 28 - 29 Mar, sub: Rpt of action night of Mar 28 (1st Div Box 101, 33.6).

The 7th FA reported 350 gas shells on four of its batteries, with 6 casualties resulting when a single 150-mm mustard gas shell exploded in a gun pit. The 26th Infantry estimated 800 phosgene and mustard gas shells in its area, with just 2 casualties as a result. Altogether, these units reported approximately 1,650 gas shells and 22 casualties.⁸¹

Actually, according to Hanslian, the entire artillery of the 78th Reserve Division was organized to fire an extensive bombardment on 1st Division battery positions with 4,760 blue cross and 5,530 green cross shells - a total of 10,290 rounds. Despite 1st Division reports, there is no evidence that any mustard gas was used in the bombardment. Much of the effect of the attack was believed to have been nullified when, soon after the bombardment began at 2130, strong winds and rain squalls sprang up, and the mission was called off before its completion.⁸²

The Division Gas Officer reported correctly that only blue and green cross shells had been used and that they fell on Rambucourt and Mandres, on six batteries in the 6th FA and two in the 5th FA. He confirmed that the high wind that sprang up shortly after the shelling began had greatly reduced probable casualties. Nevertheless, 25 men were evacuated, and one man,

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Ltrs, RGO 7th FA, RGO 26th Inf to C of Gas Serv, 29 Mar (CAF-1st Div); Spencer, I, 35 - 38; SOI and DOR, 28 - 29 Mar, reported 2 officers and 11 men gassed.

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Hanslian, pp. 73 - 74. 78th Res Div WD, 28 Mar, said the second part of the gas fire was postponed on account of storm and rain.

thought slightly gassed with phosgene, fell down dead the next day while working in the trenches. Captain Davis also reported to General Bullard his observation that ambulance company men had made the gassed walk from the aid post to the ambulances, and sit up on the trip from Mandres to Menil la Tour. As a result of Bullard's orders it was not to happen again.⁸³

In better weather the gas attack of 28 March, with the remaining blue and green cross shells, was said to have been completed beginning at 2330 on 31 March.⁸⁴ There is no G - 2 report available for that date, but G - 3 said that from 2200 - 0300, 31 March - 1 April, the village of Seicheprey, the trenches above the village, Beaumont, Mandres, and Rambucourt were bombarded with HE, shrapnel, and gas shells. Two men were killed, 2 wounded, and 8 gassed. "The bombardment was mostly directed at the batteries but was quite scattered, creating a gas atmosphere."⁸⁵

In little wind and high humidity, said the 6th FA, "phosgene, mustard and tear gas swept the roads and batteries for five hours." All batteries of the regiment were subjected to the gas and HE bombardment, resulting in 29 eye cases, 21 of them in one battery where the men, in the absence of their officers, removed their masks. The 7th FA estimated 3,500 gas shells,

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Ltr, DGO to CGO I Corps, 31 Mar, sub: Weekly Narr Rpt (GAF-1st Div).

84

Hanslian, p. 75; 78th Res Div WD, 31 Mar.

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DOR, 31 Mar - 1 Apr; msg, King CofS to Conner, 9 A.M., 1 Apr (Records 12).

most of them phosgene but some mustard gas, "mixed with many more high explosive shells," that resulted in 3 gas casualties among five battery positions.⁸⁶ The attack came at a time when "the roads were full of our division marching out and the 26th Division marching in....One man [at Mandres] from the 26th Division was gassed. He had no gas mask."⁸⁷

Captain Davis estimated that a total 3,500 yellow, blue, and green cross shells of 77, 105, and 150 caliber had been fired in this "very heavy gas bombardment" on the batteries of the division. He reported "only 32 casualties," a tribute to good gas discipline.⁸⁸ The division did not recognize the bombardment as a repeat or continuation for the failure of the earlier one. "We think," the Chief of Staff wrote, "it was due to nervousness on the part of the Boche; that the movement [i.e., the relief then in progress] on this side made him afraid that something was going to happen."⁸⁹

As the Analysis shows, there were probably more than 57 gas

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Ltrs, RGO 6th FA, RGO 7th FA to C of Gas Serv, 1 Apr, sub: Enemy gas shell bombardment (GAF-1st Div and Records 14).

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ADC Jnl Opns, 1 Apr.

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Ltr, DGO to CGO I Corps, 11 Apr, sub: Narr Rpt, Week ending 6 Apr (GAF-1st Div); Spencer, I, 39. The 1st FA Brig did not agree on the discipline. See Memo 93, 1st FA Brig, 30 Mar (Records 9).

⁸⁹

Msg, King to Conner, 2 Apr (Records 12).

casualties as a result of this major gas attack, but not enough more to make it anything like an enemy success. The 1st Division was never to know what, except for bad weather, it had escaped.

The New Arsines

The gas attack on the 1st Division on 28 - 29 March was probably one of the first on American troops in which diphenylchloroarsine (blue cross) was used, and though it was recognized as such by the Division Gas Officer, the new gas was not remarked by anyone else reporting on the attack. Just the day before this attack, an operations memo reported that "the enemy has a blue cross shell which emits smoke, not in itself poisonous, but composed of small particles which penetrate our masks, and irritate the throat and lungs. These shells are always followed by poison gas shells" [i.e., phosgene or diphosgene - green cross].⁹⁰

As a matter of fact, the blue cross shell was not new. Small quantities of it were first introduced on the British front in the summer of 1917, with good results. The Germans appear to have thought so highly of the shell that they at once put it into mass production, turning out vast numbers of both blue cross and colored or variegated (Buntkreuz) shells, the latter containing

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Opns memo 10, 26th Inf, 27 Mar (Records 10); CWS WSI, 10 Apr. Cf. Service Note, 2nd FA Brig, 3 Apr (2nd Div Box 84), on the introduction in March of blue cross shell "with one-quarter of its charge of solidified arsine that is pulverized on burst" and green cross - 2 shell, triple-charged with "superpalite, oxychloride of carbon, and chloride of diphenylarsine (trichloromethyl chloroformate)."

both phosgene and diphenylchloroarsine.⁹¹ The blue cross shell was apparently the secret weapon for the spring offensives of 1918, for they were apparently first used in great quantities in the attack of 21 March. Two months later, after the introduction of the ethyldichloroarsine shell (yellow cross-1), these two gas shells were to comprise as high as 70 percent of the gas fired in preparation for the attack launched from the Chemin des Dames on 27 May.⁹²

Few besides gas officers seem to have been immediately aware of the new gases. Lieutenant Butler, for example, never mentions them but refers only to the three gases of AEF pamphlet 253, chlorine, phosgene, and mustard gas; and G - 2 speaks of "gas resembling chlorine," "a gas causing nausea, sneezing and coughing," and "sneeze gas."⁹³ "Sneeze gas," though sometimes applied to chloropicrin, became the common name for the arsines. It was June before a reference in an intelligence report is found to "Chlorine Arsine and Bromine Arsenic."⁹⁴

The 1st Division was to be in Picardy when the great German offensives of May and June were launched in that area. But a whole week passed after being ordered to that front before the division cleared the sector at Ansauville.

91

Maj. Gen. C. H. Foulkes, "Gas!" The Story of the Special Brigade (Edinburgh, 1934), pp. 248 - 49, 328.

92

See appendices to SOI 55 and 58, 1st Div, 20 - 21 and 23 - 24 Jun (Records 4).

93

SOI 5, 6, and 29, 1 - 2, 2 - 3, 25 - 26 May.

94

SOI 43, 8 - 9 Jun.

ANALYSIS

Battery and Counter-battery

General Bullard's order to stir up the enemy, upon his assuming command in the relatively quiet Ansauville sector in early February, was carried out diligently by his artillery and his raiding infantry. His G - 3 section recorded 35,298 shells fired in the period 4 - 28 February, 90,469 rounds fired in the month of March, and 2,133 through 2 April, for a total of 127,900 rounds. Included in this total were 9,251 No. 4 and No. 5 gas shells.⁹⁵

Enemy artillery, according to G - 3, fired half as many rounds in reply. Almost 21,510 rounds were recorded falling in the sector in February, 41,558 in March, and 4,122 in early April - a total of 67,190. G - 2 daily reports show less than half that total of enemy shell or 28,992.⁹⁶ However, G - 2 attempted to estimate, as G - 3 did not, the gas shells included in its daily totals of enemy fire. These add up to less than 500, not counting the correction on the 900 projectiles in the 26 February attack. German data

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Compiled from DOR, 1st Div, 4 Feb - 2 Apr (Records 12). Memo, EMO 1st FA Brig, 27 Feb 1919, sub: Ammo expended by 1st FA Brig shows 93,636 75-mm and 26,227 155-mm shells fired between 23 Jan - 4 Apr, a total of 119,863. A detailed breakdown of this total appears in 1st FA Brig Arty Rpt, 23 Jan - 11 Nov. Gas shells are reported in Rpt, Special Shells...(all in Records 14).

96

DOR, 2 Feb - 2 Apr. Beginning 12 Feb, G - 2 reported 7,035 shells that month, 21,957 in Mar and early Apr. Lt Butler's frequent but incomplete shell counts in his journal agree with G - 3 rather than G - 2 data.

in the narrative, however, indicate that with that projector attack, the total of gas shells fired against 1st Division battery positions in February and March approximated 13,900 rounds.⁹⁷ Although this appears somewhat high, in view of the results obtained, it does not seem possible to question it without further data.

Casualty Report

As a result of the increased artillery fire, gas attacks, and frequent raids on the Ansauville front, the casualties between 18 January and 31 March, said the division history, were 6 officers and 137 men killed, 19 officers and 384 men wounded, and 3 men captured, for a total of 549 battle casualties. Gas cases were not distinguished.⁹⁸

G - 3 records, which begin on 2 February, reveal a total of 385 casualties at Ansauville: 79 officers and men killed, 160 wounded, 123 gassed, and 23 accidentally wounded, and indicate that the greater number of the killed and wounded occurred during enemy or division raids, as a result of enemy snipers, or were occasioned by a series of unaccountable gun bursts among the batteries.⁹⁹

⁹⁷ Narrative, pp. 22, 30, 32, 37, 43 - 44.

⁹⁸ History, p. 64; page 337 shows another total of 553.

⁹⁹ For the gun bursts, see ADC Jnl Opns, 27 Feb and passim.

A postwar report, based on then available DGO records, showed 14 officers and 113 men gassed in the Ansauville sector.¹⁰⁰ Greater either than the G - 3 total of 123 gas casualties or that of the DGO is the total of 221 officers and men evacuated as gas cases and 9 gas deaths, found by an actual count of gas casualties in the narrative. It is estimated that 163 or 70 percent of these gas casualties were artillerymen or service troops with the artillery.¹⁰¹

Still higher gas casualties appear in an undated document apparently prepared by the Division Surgeon, which reports a total of 327 gas cases admitted to the gas hospital at Menil la Tour, as well as 13 gas deaths, between 21 February and 4 April.¹⁰²

	Admissions	Deaths
Week ending 28 Feb	64	6
7 Mar	43	0
13 Mar	104	0
21 Mar	67	0
28 Mar	49	2
4 Apr	0	5
	<u>327</u>	<u>13</u>

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Ltr Capt A. H. Bengs, DGO 1st Div to C CWS, 27 Jan 1919, sub: Rpt on Circ Ltr No. 89 (GAF-1st Div).

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Pp. 13, 18, 23, 28, 31, 33, 39, 43 - 44, 45 - 46.

¹⁰²

Rpt, Non-effectives and deaths from gas attacks on 1st Div (GAF-1st Corps). Note: The division gas hospital was set up at Menil la Tour on 17 Jan, but no lists of daily admissions are to be found in Med Dept or Surg Gen records until 30 Apr.

To this total of 340 should be added the 59 cases reported in this chart on 28 February as remaining in the hospital from gas attacks prior to that date. The resulting total of 399 represents a considerable increase over the 230 gas casualties found in the narrative. Furthermore, it is probably a minimum total since there is no medical record of gas cases between 18 January, when the division came into the line, and 28 February, except those remaining in the field gas hospital on the latter date.

Questionable, in comparison with the data of the division history, is the Division Surgeon's report of total casualties at Ansauville of 5 officers and 51 men killed, 12 officers and 138 men wounded, and 14 officers and 509 men gassed, for a total of 729 casualties. Yet that total of 729 (56 killed, 673 gassed and wounded) approximates the 674 gassed and wounded (323 gassed, 351 wounded) reported elsewhere by the Division Surgeon.¹⁰³ In view of the report tabulating weekly admissions of gas casualties, there seems little doubt that gas cases exceeded wound cases at Ansauville.

For purposes of computation this study will accept 56 as the number killed, 351 (though unquestionably excessive) as the wounded, and the fairly certain figure of 399 as the number gassed. The enemy fired a minimum total of 67,190 artillery shells against the 1st Division, of which approximately 13,900 were gas shells. Although in one heavy bombardment followed by a raid, two-thirds of the killed and wounded resulted from the

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Both sets of figures appear in MS. Hist of Med Dept, 1st Div, 14 Jan 1920, pp. 3, 4 (Medical Dept Box 3398, fol 1).

raid (narrative, p. 28), it is assumed here that all casualties were from artillery and not small arms fire. Thus the 407 killed and wounded would represent one casualty for every 130 HE shells, and the 399 gas casualties would represent one casualty for every 35 gas shells.

Seldom again during the war would so many gas shells be required to produce a gas casualty, least of all in the 1st Division.

More remarkable is a computation for the 78th Reserve Division, based on its admitted casualties of 30 killed and 175 wounded [and gassed?] in the month of March.¹⁰⁴ That month the 1st Division artillery alone fired approximately 48,700 HE rounds, and with attached French artillery, fired 7,673 gas shells into the enemy sector. Assuming the "wounded" to include gas casualties, and none were small arms wounds, 275 shells were required for each German casualty.

One other computation, with probably more accurate data, may be made - that for the projector attack of 26 February (narrative, pp. 22, 24). Of 900 projectors prepared, 849 were fired in two salvos. Since 80 were filled with high explosive, it may be assumed that at least 780 of the phosgene-filled projectors were launched to achieve the crash concentration. No allowance will be made for the "half" of the bombs later reported by a prisoner to have fallen inside the German lines. 1st Division gas casualties as a result of this attack were 77 hospitalized and 8 dead, or 37 percent of the men exposed. They represent one casualty for every nine projector shells,

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78th Res Div WD, 31 Mar.

a considerably higher ratio than had been achieved with artillery shells. This is not remarkable considering the proportion of gas to weight of vehicle in projector and artillery gas shells (approximately 50 percent and 10 percent respectively), but it is remarkable when compared with the effectiveness of artillery gas shells in later gas attacks, where but four or five shells were sufficient to produce a casualty.

"We...touched them up quite a bit..."¹⁰⁵

G - 3 reported that the division artillery fired a "gas concentration on an active battery" on both 16 and 17 March and again on 28 March, but these are the only references in the daily reports for the period at Ansaerville that the division retaliated against the enemy with gas fire.

Butler's journal indicates much more frequent use of gas, and this is confirmed by the artillery brigade summary which indicates that the brigade fired gas shells on 39 of 64 of the days (1 February - 4 April) while in the Ansaerville sector. On some days it fired no more than 20 rounds. The greatest number of rounds, 4,411 were fired for raids on 11 March. Altogether, at least 9,251 rounds of gas were fired, including 4,002 155-mm rounds, 3,257 75-mm rounds, and 1,992 75-mm rounds fired by the French artillery - most of it phosgene, with some proportion of cyanogen chloride. The total of 9,251 does not include the 6,000 rounds probably fired on 4 March, but for which no positive record remains (see narrative, p. 30).

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Narrative, p. 20.

During February, the division was allowed less than 100 rounds of gas shell per day. In March, as a brigade memo shows, this was increased and each 75-mm battery was authorized to maintain 2,780 HE, 220 shrapnel, and 600 gas shells at its position, as well as 1,500 HE and 300 gas shells at each 155-mm battery position.¹⁰⁶

General Bullard was to say that "The gassings the enemy was giving us were more than answered. The French gas which we were using was very deadly and the enemy had a wholesome fear of it." While General Bullard's statement was not strictly true, its general accuracy was reflected in the G - 3 report in late March that "the anxiety of prisoners [captured in a raid on 28 March] to take their gas masks with them showed the effectiveness of our gas bombardments."¹⁰⁷

As interesting as the allotment of gas shells by the French to a new and untried American division was the willingness of the division to use it. In the months to come, the divisions in the field were either to complain that they could get little or no gas shell, or in some cases were to show a marked reluctance to fire such gas shell as was allotted to them, in the hope that the enemy would not return the gas fire. All who like the 1st Division recognized the necessity of opposing gas with gas and valued its employment in tactical operations, were to complain that they could not get the quantities of gas shells they requisitioned.

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Memo, 1st FA Brig, 18 Mar, sub: Arty Ammo (Records 9).

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Personalities, p. 159; DOR, 28 - 29 Mar.

It was, of course, the repeated "touching up" of the enemy artillery with gas on the Ansauville front that led to retaliation and to the high incidence of gas casualties among the artillerymen. The result was that the greater number of gas memos and instructions issued by the division were directed to the artillery rather than to the infantry.¹⁰⁸ Supplementary instructions to AEF pamphlet 253 also tended to show special concern for the artillery. In general it may be said that the requirements of alternate battery positions, relief teams, and maintenance of complete individual gas protective equipment for artillery personnel were developed on the assumption that the artillery was the principal target of enemy gas fire and that it would have to continue to fire during and after gas bombardments while the infantry remained in gasproof dugouts until any gas in their area had dissipated. It was some time before the frequency of gas attacks on the infantry demonstrated that their gasproof dugouts were gas traps more often than not.

Events in the winter and spring of 1918 served to increase the concern for the protection of artillery. The period was marked by rapid changes in methods of gas warfare, first as a result of developing doctrine by the Germans in the use of mustard gas, and by their introduction into the field of the arsine gases. One result, apparently, based on the enemy's use of

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Cf. memos cited in the narrative; ltr, Asst DGO to CG 1st FA Brig, 21 Mar, sub: Defensive measures against mustard gas (1st Div Box 57, 63.32); memo 90, 1st FA Brig, 21 Mar (Records 9); ltr, CG 1st FA Brig to CG 1st Div, 24 Mar, sub: Rpt on TM Positions (Records 14).

gas and their own use in retaliation, was the formulation by the French of the doctrine that "gas shells are most often used for the neutralization of batteries, giving the best results for this purpose."¹⁰⁹

Both von Hutier at Riga and von Bülow at Caporetto, in September and October 1917, demonstrated the effectiveness of a short intensive preparation with gas on the opposing artillery and massive high explosive fire on the infantry just before an attack. In the spring offensives of 1918, Ludendorff was to improve on this tactic by using great quantities of the new arsine gases, following them with lethal phosgene. By employing these gases on the artillery and hitting the infantry on his front with HE from massed minenwerfers, he created the gaps in the line for his deep penetration and maneuvers of rupture.¹¹⁰

Through the winter and spring of 1918 mustard gas continued to be used in large quantities principally to interdict terrain and neutralize opposing battery positions. One of the last large-scale uses of mustard gas was the five-day saturation with over 250,000 yellow cross shells, on 11 - 16 March, of that portion of the British front outside the attack zone, prior to the

109

Instru on Offensive Action of Large Units in Battle, 31 Oct 1917, pp. 167 - 168 (GHQ AEF G - 5 Schools Box 1727).

110

CWS Weekly Summary of Information (hereafter CWS WSI), 24 Apr, 5 Jun, 12 Jun, 31 Jul (WD Hist Box 289); Div Info Bulletin, 24 Jun (2nd Div Box 106); Extracts from a German Document, n.d. (89th Div Box 20, 33.21).

offensive on 21 March.¹¹¹ But in the final months of the war, in their efforts to conserve their dwindling supply, the Germans discovered the effectiveness of mustard gas, as well as of the harassing and lethal gases, in small daily concentrations on troop positions.¹¹²

With the opposing infantry as the principal target, the Germans developed the Gas Überfall or burst of fire, a short surprise fire on small targets; the Verseuchungsschiessen or zone concentration fire on terrain important for the enemy to occupy; the Schwadenschienen or sheet fire, for use against troop areas; and HE-gas fire, against moving objects.¹¹³ All these methods were based on multiples of 100, that is, 100 rounds per target, 100 rounds per hectare, 100 rounds per hour, with the result that German gas attacks in the closing months of the war were made with gas shells by the thousands, at most, and no longer by the hundreds of thousands.

If these German developments had their impetus in conservation of gas ammunition, they were also made necessary by the insistence of the AEF on conducting their operations by open warfare methods. And the size and inexperience of the American divisions made their infantry rather than their

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CWS WSI, 27 Mar, 4 Apr.

112

CWS WSI, 10 Apr.

113

French Tenth Army Bulletin, 21 Sep, sub: Methods and Conditions of German Gas-Shell Firing (1st Army Box 26, 22.31, fol 4).

artillery the logical gas target.

The infantrymen of the AEF were to have no reason to question the effectiveness of the relatively small gas attacks that they experienced, and no doubt about the intended target. But so far as the 1st Division at Ansauville knew, the principal gas target was the artillery, not the infantry.