SECRET

HEADQUARTERS 1ST TANK DESTROYER BRIGADE
Office of the Brigade Commander

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TANK DESTROYER INFORMATION)
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SECTION I

CUMULATIVE REPORT OF TANK DESTROYER UNITS TO 21 JANUARY

BATTALION	TOTAL TANKS DESTROYED	TOTAL SP GUNS DESTROYED	TOTAL ARTY & AT GUNS DESTROYED	TOTAL ROUNDS FIRED	ROUNDS FIRED DIRECT	ROUNDS FIRED INDIRECT
602	35	7	39	7753	4234	3519
603	48	21	29	13279	6195	7084
607	53	22	21	59155	7169	51986
609	25	3	11	14856	1200	13656
610	66 -78		24	6717	3517	3200
630	8		1	710	199	511
631 (1)						
654	52	7	30	9161	5339	3882
691	6	2	1	8801	1797	7004
704	43	3	4	1402	758	644
705	16	5	2	3764	1909	1855
773	104	19	26	10417	7249	3168
774	5		11	27975	7312	20663
802	4	2	18	17027	6389	10638
803	9	6	12	3309	77	3232
807			19	40170	13220	26950
808	4		5	27320	3045	24275
811	3			11	11	
818	32	2	14	19988	2924	17064

In addition to the tanks and self-propelled guns destroyed as shown above, Third Army Tank Destroyers have also destroyed 336 machine guns, 431 pillboxes, and 861 other targets, including artillery prime movers, GP vehicles, OPs, AAA guns, troop trains, ammunition dumps, airplanes, etc.

(1) Not yet in action.

SECTION II

TANK DESTROYERS IN COMBAT

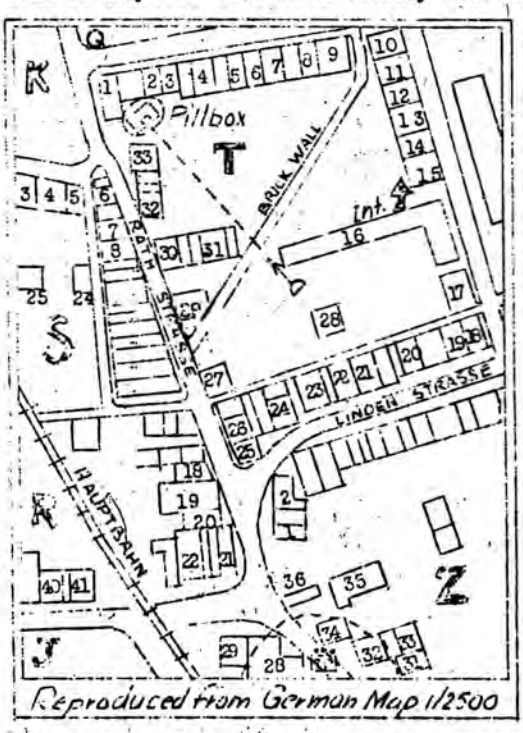
607TH TANK DESTROYER BATTALION (SP):

Situation No. 1: (See Sketch #1)

A tank destroyer platoon was supporting an infantry battalion in the assault through a fortified town. The platoon was assembled in the vicinity of houses Z-28, 34 and 32. The infantry had taken and cleared all of blocks J, R and S and buildings 10 to 33 in block T. The infantry commander requested fire be placed on a pillbox between T-1 and 2 to neutralize it while they assaulted the row of houses T-10 to 15. The infantry commander wanted the platoon leader to send a destroyer up Rath Strasse, but from a study of the map the platoon leader considered the use of this route impracticable because of undue exposure from enemy held territory of block K and Q. The infantry commander informed the platoon leader that the road running through block S near S-24 was open and passable, that his men were using it. As this gave a covered route, the platoon leader sent a destroyer to proceed over this route to a firing position between S-5 and 6. The destroyer left, but its commander found the road was not passable to vehicles due to fallen trees and debris. He returned and reported this to the platoon leader, who immediately made a foot reconnaissance of the route and verified that it was impassable. He continued his reconnaissance and found a possible route to another firing position at the West end of T-16, but was unable to make a detailed reconnaissance due to heavy mortar fire between T-27 and 29. The platoon leader returned and suggested that a tank make the reconnaissance inasmuch as a tank would have the benefit of a covered turret. This was agreed upon and the tank proceeded to the proposed firing position and, in addition, cleared a line of fire to the pillbox by shooting a hole in the wall that runs from T-27 to T-9. It then withdrew and the tank destroyer platoon leader was informed that the route was clear and the firing position good. The destroyer then proceeded at a rapid rate to the position which the tank had reconnoitered, running through the mortar fire. It fired ten rounds into the pillbox, neutralizing it with penetrations.

Conclusion:

Personal reconnaissance of routes is most essential. Complete reconnaissance must be made on foot whenever possible. What may appear to be a good route to some is not a good route to a tanker or tank destroyer man. A good use of tanks for reconnaissance under fire is here demonstrated. Tankers verify passable routes for tanks or tank destroyers. Coordinate closely with other arms.



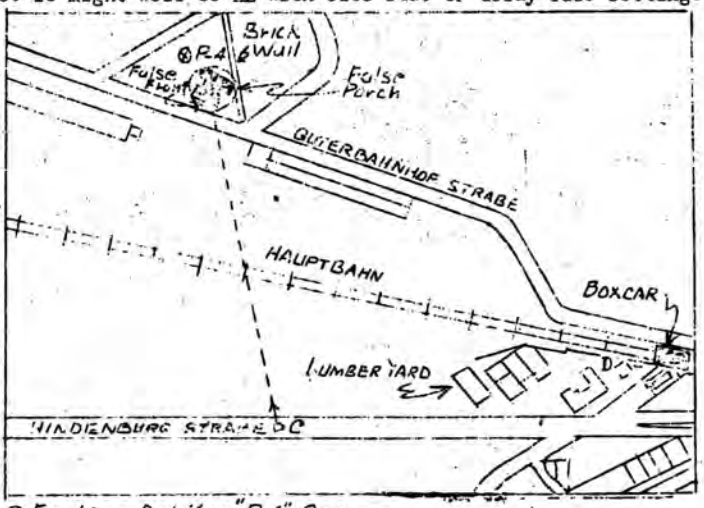
Sketch #1 to Accompany Situation No. 1

Situation No. 2: (See Sketch #2)

Pillbox P-4 was discovered by infantry and preliminary fire from a tank destroyer placed on it from point C, knocking down the brick camouflage. However, a brick wall and great quantities of debris and demolished box cars on the tracks partially obstructed the view and no attempt was made to clear field of fire. Twenty-five rounds in groups 10-10-5 were fired to persuade the Jerries to give up. No specific point was picked to fire upon. Destroyer then moved to point D to get a better angle of impact. Still not enough effort was made to knock away some of the wall that was obstructing vision. The Jerries, except for the NCO were persuaded to give up. Engineers then blew a hole in doorway. Gas fumes overcame the NCO.

Lesson:

Use a few extra rounds to clear the field of fire. Then pick a point (if aperture is still obscured, choose a point 10 foot down and 10 foot in from a corner) and start pounding. Ten rounds of APC will do the job if pattern is good. No. 5 and No. 10 might well be HE with T105 fuze or delay fuze setting.



⊗ For More Detail on "P-4" See Illustration Top Of Page 4

Sketch #2 to Accompany Situation No. 2

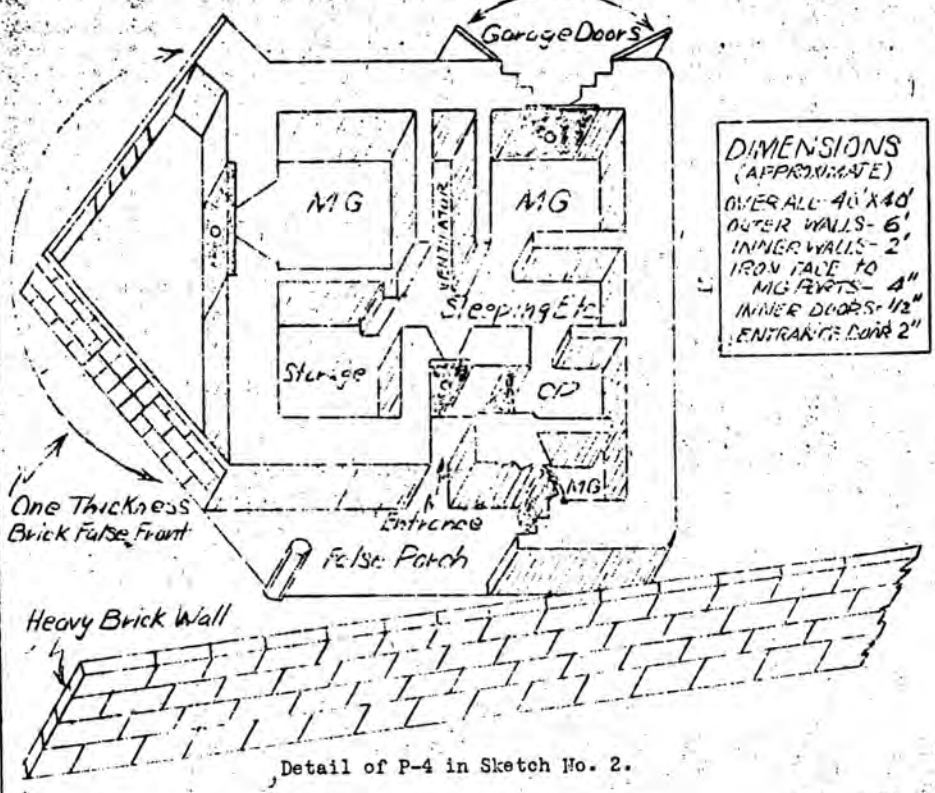
Situation No. 3: (See Sketch #3)

Pillbox South of D-36 was the objective. A squad of infantry plus some engineers were brought to house J-1. A destroyer was brought to opening South of house J-16. At 1400 smoke was placed on houses and high ground North of pillbox. The destroyer then moved West about 75 yards in order to shoot past building J-10. The destroyer fired 5 rounds APC at doorway of pillbox. Due to haze, target was not clearly visible so an auxiliary aiming point was used for both range and deflection (actual settings used were 6 loads and 700). The first round (a sighting shot) was sensed by a lateral observer (platoon sergeant) and the settings mentioned above arrived at for delivery of four succeeding rounds. Mortars swept houses D-35 to 28 and F-23 to 26 and Q-14 to 19. The infantry jumped off after the 5th round and proceeded to the pillbox which fell without further action. Five Jerries surrendered. One, left behind in the pillbox was dead. The engineers followed up closely with composition 2 and blew the pillbox. All Americans returned to starting points. Action started at 1400 and ended at 1410 with the exploding of the C2.

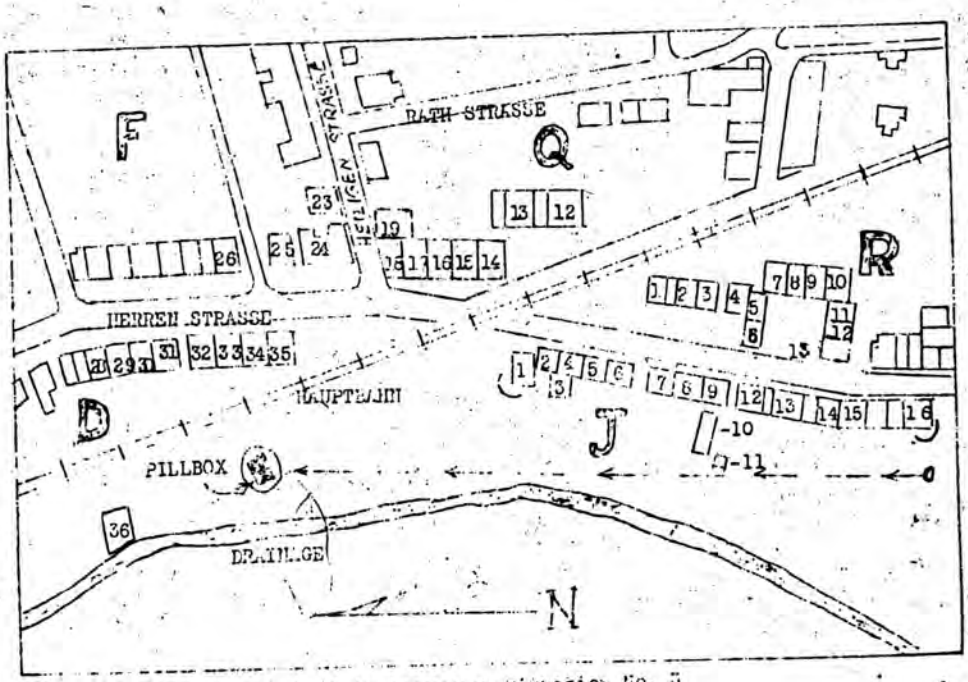
Comment:

This is an excellent example of a well organized operation. Note that pillbox was blown to prevent its being retaken by the enemy; this point has been found to be highly important.

PILLBOX, Camouflaged as House (Isometric View



Detail of P-4 in Sketch No. 2.



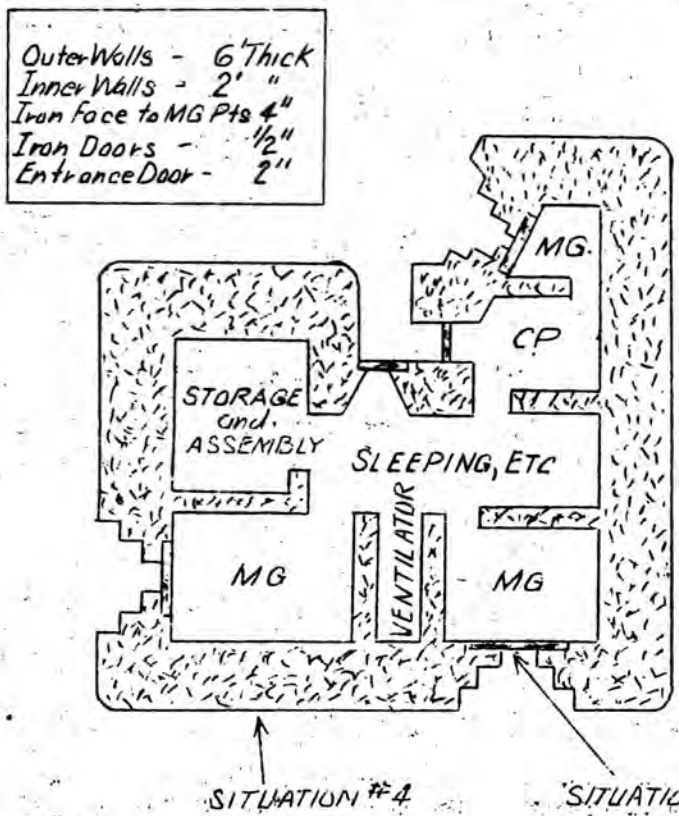
Sketch #3 to Accompany Situation No. 5

Situation No. 4: (See Sketch #4)

The gun commander reconnoitered a covered route to a firing position 150 yards from a pillbox. Angle of fire 10° from right angles to face of pillbox. At this position the right half of near side was not visible due to intervening buildings. The gun commander elected to shoot at a point on the blank wall about 15 feet from the left hand edge and 4 feet from lower edge of the pillbox. Five rounds of APC were fired. The gun commander reported he thought the fourth round penetrated and knew the fifth round had penetrated. Six PW's were taken out of this pillbox. They came out prior to Infantry assault and did not show any physical effect from the rounds fired. The PW's were very anxious to know what kind of "super" weapon we used which could go through their "impregnable" pillbox. They had given up as soon as they saw the pillbox could be penetrated.

Construction of the pillbox was as represented in sketch #4. This is reproduced from a sketch made of the particular pillbox described in the above situation. The concrete was a very good quality with reinforcing steel about every 12 inches both in width and depth throughout entire wall.

TYPICAL PLAN of PILLBOXES in SAARLAUTERN AREA



Sketch #4 to Accompany Situations No. 4 & 5

(In the following situation - No. 5 - the same diagram as in Situation No. 4 will be used. It was found that most of the pillboxes were of the same basic construction whether they had one or five firing ports and whether there were two or more compartments. Where there are several compartments, each one is constructed to be fought independently, even if the other is destroyed. However, in most of the pillboxes we assaulted the Germans did not fight them in this manner; i.e., they would leave inner doors open ((probably when retreating from threatened compartment)) so that fumes and concussion from HE or cement dust from APC would drive out the occupants).

Situation No. 5: (See Sketch #4)

Reconnaissance disclosed that the only covered route to a point from which the target could be fired upon from a protected position, ended at an intervening shed with a rear wall of brick. Engineers assisted by blowing a hole through this wall and the tank destroyer was then able to fire from a covered position. The portion of the pillbox exposed was a corner (see sketch #4). The gunner could see approximately 8 inches of the machine gun aperture. The gun commander elected to shoot at the aperture, though the angle of fire would be about 40° from perpendicular. Six rounds of APC were fired, followed by two rounds HE with T-105 fuze. Two of the six rounds of APC hit the portion of the armor plate of the machine gun aperture exposed to view and both rounds penetrated, going inside and causing considerable damage. The other rounds hit one side or the other of the embrasure and richocheted off without effect. The two rounds which penetrated, knocked off the inner doors of the compartment, smashing the inner partition wall. The occupants surrendered.

The lessons to be learned from the above situations (Nos. 4 and 5) are:

(1) To obtain penetration, all shots must be as closely bunched as possible.
(2) One round is sufficient to penetrate the armor plate at the machine gun aperture and therefore this is the best point to hit if it is at all possible.
(3) To obtain maximum effect against personnel inside the pillbox, follow up with HE delay fuze after penetration is obtained.

During the discussion that followed a conference on the above situations, the following points were brought out:

(1) Universal experience of our gunners was that HE with T-105 fuze obtained practically no effect (i.e., appeared to get only low order burst) when fired against a pillbox at a range of less than 1200 yards.
(2) When the pillbox target is indistinct, due to either distance or haze, it frequently helps to aim at a distinct point (i.e., top of fence post, tree fork, etc.) and by them taking appropriate leads and elevation difference in the telescopic sight from this point, or a reference point to adjust on the pillbox. Once a hit is obtained in the proper area, the gunner, by using the same lead and elevation from this point, will be able to place the remainder of his shots in the same place on the target.
(3) The best place to hit on a blank wall of a pillbox is a point about 10 foot from the edge and about 10 foot from the top horizontal line. This will allow approximately 6 to 8 foot for the side walls and the roof and on all pillboxes examined would have avoided both outside walls and inside partitions and would have obtained penetration into one of the rooms in the pillbox. (Commanding Officer, 607th Tank Destroyer Battalion).

630TH TANK DESTROYER BATTALION (TOWED):

During night 16 - 17 December enemy tanks and infantry continued movement West. Enemy tanks and infantry overran MARBACH, position of the 1st Reconnaissance Platoon and Company "B", 110th Infantry. Two tanks and one halftrack known destroyed by reconnaissance platoon. (The two tanks were knocked out by Cpl Daniels with a rocket launcher).

On 17 December enemy continued move West. Two guns, 2d Platoon, Company "B", in MUNSHAUSEN continued to hold their position with enemy foot troops attempting to cut road behind them. No further word from this section of 2d Platoon, Company "B", but reported to be holding out at MUNSHAUSEN.

At 180500 infantry support of 3d Platoon, Company "B", was gone and at 0530 the remaining two guns were attacked and overrun. During days 16 - 17 December this platoon knocked out 14 German tanks, 1 88mm self-propelled gun, several general purpose vehicles and about 300 enemy infantry.

At 181400 the two guns of 1st Platoon, Company "B", near ESCHWEILER were attacked by German infantry, but determined to hold their positions, the guns took the enemy under direct HE and machine gun fire and succeeded in breaking up first attack by killing over 100 enemy. At 1500 this section was forced by flanking fire to destroy their guns and drop back on foot as they had no infantry support. At 1700 the section of 1st Platoon, Company "B" at DEREINBACH was attacked by tanks with infantry riding on them, and, by surprise fire at a range of 400 yards destroyed 1 Mark V tank and the infantry riding on it. This forced the others to

630th Tank Destroyer Battalion (Contd)

drop back, but dismounted enemy overran the first gun and the second was attempting to change its direction of fire when a tank knocked out its prime mover. The second gun was then overrun.

On the morning of 19 December 3d Platoon, Company "A", working with elements of 3d Battalion, 112th Infantry, sent out scouting parties, and then moved to RJ at P730512. At 1200 the platoon moved to vicinity ROULLINGEN (2 guns at P700522 and 1 gun at P705528). Gun positions dug by 1330 and defense coordinated with infantry. During afternoon enemy tanks and infantry attacked WILTZ from HOCHER. Enemy was allowed to approach position and point of enemy killed by small arms fire. Three inch guns opened fire when enemy tanks, halftracks and personnel were in open nearing positions. Six enemy tanks and four halftracks were known to be knocked out, with number of infantry killed. Enemy infantry attacking from woods fired upon with direct HE fire. After the guns of Sgt Luznar had expended all its ammunition, Sgt Luznar and two members of his crew went to the next gun section, and although they were under direct small arms and machine gun fire during the operation, carried three inch ammunition from the other section to their own gun. These guns continued firing (much of which was at infantry at close range) until they had expended all their ammunition. One gun knocked out. The members of the gun crew then fought with their small arms and machine guns. Pvt Herbert Williams, noticing enemy foot troops nearing the positions from an unprotected area, removed a caliber .30 machine gun from its mount and holding it in his arms, and while in an exposed position, fired on the enemy, breaking up their attack. Pvt Williams then moved from place to place in the village, firing from each--sometimes a building, at other times a position of little cover. By his moving the gun from place to place, the enemy was led to believe the force in the village was much larger than it was. (Extracts from 630th Tank Destroyer Battalion report on operations during German breakthrough in the ARDENNES).

654TH TANK DESTROYER BATTALION (SP):

On 30 December 1944 the enemy counterattacked to cut the BASTOGNE corridor. The 1st Platoon, Company "A", 654th Tank Destroyer Battalion, was in support of the 3d Battalion, ___ Infantry Regiment. Lieutenant Dunne, 1st Platoon Commander, after a foot reconnaissance selected positions in the vicinity of REMOIFOSSE, Belgium. An enemy armored column approached LUTREBOIS. The column consisted of fifteen (15) tanks accompanied by about 200 enemy foot troops. The column was advancing toward the BASTOGNE Highway. Before opening fire Lieutenant Dunne's platoon allowed the enemy tanks to move out into an open area about 800 yards from his platoon's position. Lieutenant Dunne with only two M-10s operational at the time opened fire using 3" AP ammunition. Four of the enemy tanks were immediately destroyed. After the four enemy tanks were destroyed, Lieutenant Dunne's platoon was joined by a platoon of tanks from an armored division. Collectively the two platoons destroyed eleven (11) more enemy tanks, one of which was a Tiger Royal. The caliber .50 machine gun being mounted on an improvised forward mount allowed the use of this weapon simultaneously with the 3" gun and as a result 150 of the 200 enemy infantrymen were annihilated. (Commanding Officer, 654th Tank Destroyer Battalion).

8 Jan 45 vs Pz Lehr in Bastogne corridor — see also 9 BN H

691ST TANK DESTROYER BATTALION (TOWED):

Recently one gun of the 3d Platoon of Company "B", commanded by S Sgt Fred W. Splotstoser, engaged in a fire fight with two Mark V Panther tanks. The resultant action ended in the destruction of one tank and the disabling of the other.

The gun was in a position at the corner of a stone wall which surrounded a hunting lodge in the vicinity of GERIMONT, Belgium when the two Mark Vs emerged from a woods about 2600 yards away. The gun immediately opened fire on the tanks which returned its fire from both of their 88s. In the ensuing fire, due to lack of sufficient armor protection or protective defilade, the gun crew was forced to leave the gun and seek cover behind the stone wall. The tanks, evidently believing that the gun had been knocked out, ceased firing on it and the crew again manned their gun. Due to the lack of movement of the tanks and the snow covered terrain, it was difficult to accurately determine range and again the tanks returned the gun's fire, cutting down trees and tearing up the stone wall around the gun, forcing the men to seek cover repeatedly.

S Sgt Splotstoser manned the sight himself and finally succeeded in burning one of the tanks and disabling the other which was abandoned by all of the crew except the driver who managed to move the tank into position where it was impossible to set it on fire. This complete engagement lasted for 45 minutes in which the game of hide and seek behind the wall had been repeated several times. The shield

691st Tank Destroyer Battalion (Cont'd)
of the gun had been pierced in several places and two of the men in the crew had received slight wounds. (Commanding Officer, 691st Tank Destroyer Battalion).

773D TANK DESTROYER BATTALION (SP):

a. An attack was planned for 0730 the morning of 14 December to take a portion of DILLIGEM immediately across the railroad tracks.

I had the 3d Platoon in support of the 2d Battalion, ___ Infantry. The plan was for the tank destroyers to break across the tracks first and take four pillboxes under fire, closing them up and attempting to knock them out. Engineers and infantry, supported by tanks, were to come through and blow the boxes and proceed into town. I was then to cover the left flank which was exposed.

I led my platoon, followed by a platoon of tanks, into position to jump off at 0725 and immediately proceeded on to my firing positions. The platoon came out on the railroad tracks at 0730. Daylight had not broken and because of that and the previous artillery preparation, visibility was zero. I ordered fire to the immediate front and flanks with HE, .50 caliber and .30 caliber. The only way we located the pillboxes was when they returned our fire. A pillbox on my immediate right did not fire and I attempted to fire it with .50 caliber to close it up. On later inspection I saw numerous holes in the concrete caused by .50 caliber. When daylight broke I moved the guns closer on three pillboxes and fired at ranges from 50 to 75 yards, penetrating in every case through the steel casements. The AP had penetrated the steel in almost every case; the steel was between 4 and 5 inches thick.

Later in the day a pillbox out of my immediate sector opened fire with machine guns and Sgt Wilson displaced one gun and took it under fire from the immediate front at about 50 yards. AP went through the steel six times and was followed up with delayed HE, destroying the section under fire. I had been informed that friendly troops were on my immediate left flank and was unable to displace another gun to fire at the box from its flank. The pillbox continued fire from its two remaining sections. I called for engineers or infantry to blow the box, but was unable to obtain any. Troops with one tank approached from my left flank and took the box under fire and finally blew the box obtaining 4 or 5 prisoners.

I believe an attack on pillboxes should never be made in the dark of when visibility is too low to fire at the target. Great fire power from small arms is needed to cover the pillboxes and its flanks to keep down machine guns and snipers in surrounding terrain. A .30 caliber machine gun mounted forward in addition to the present .50 caliber would be advisable. Communication between the infantry-engineer team and ourselves is urgently needed for proper coordination. Lateral communication with our flanks is necessary to avoid duplication of effort and the possibility of our firing on our own troops. I believe every pillbox should be immediately blown when we button it up. (John T. McMahon, 1st Lieutenant, 773d Tank Destroyer Battalion).

b. The morning of 12 January 45, I received an order to proceed to the town of SOULEZ with 2d Platoon, Company "C", ___ Tank Battalion as soon as a route was open on either of our flanks as there was no approach possible for a destroyer in our own sector.

About 1230 hours we were notified it was now possible to get to the town of DOUCOLS thence to SOULEZ, so I started out. Having no contact with the 2d Battalion, ___ Infantry, we had no means of knowing exactly what the situation was but following my orders to get there as soon as the route was clear, I took off, nosing through the woods behind the infantry and reconnoitered on foot. We got down to a valley bottom which leads into DOUCOLS from the South side. Some enemy machine gun fire was thrown at us. (3 machine guns I later found out).

We moved into town without mishap but could still get no news of situation in our sector. The platoon leader, 2d Lieutenant Fuller, of the tanks and I talked the situation over and decided we would go on through DOUCOLS to SOULEZ. From plans of the morning, the infantry surely must be there and as all was quiet decided they must be waiting on us so I took my lead destroyer with two tanks and started out, leaving my two remaining destroyers to work with the three remaining tanks which were to support the first three vehicles.

The two tanks and my destroyer started out with our primary weapons ready for immediate action and our machine guns also. When we hit the edge of town it took but a moment to) there were no "Doughs" in town or in sight) So I opened

773d Tank Destroyer Battalion: (Cont'd)
up with my .50 caliber on the nearest house on my right, the tankers opened up on the left. We advanced slowly watching for self-propelled and towed guns. We saw nothing but foot troops streaking for the houses. I kept my .50 caliber going from window to window, the tankers doing the same. After getting a few houses inside town, I told Car Commander Cpl Stefanik to put a 3" in one of the houses. We did this to a couple of houses and advanced a couple more houses.

A bazooka knocked the track off one tank, I fired a couple of .45s in the window of the house and hollered to the tankers to put a 75mm in it. He evidently didn't hear me, but the destroyer behind him did, swung his nose around and took care of the bazooka team. Then civilians started coming out and I put them all in one house. I saw a Priest who talked a little English and asked him which houses had Kraut soldiers. He knew of two, we got these. Another house where some civilians came out appeared to be empty but then I noticed a puff of vapor or breath from the cellar window. I asked the civilians if there were soldiers there, they said no. I cussed them out for liars and took a look at the window. It appeared not to be boarded for I could see in for several inches. I went back to the destroyer and got a grenade, pulled the pin and threw it in the window. The damn window was boarded up and the grenade bounced out doing little damage but nearly got me. I had the gunner put a round of 3" in the cellar. We got 18 Krauts from there. Pfc Meehan asked me about taking another house. I said "Yes, let's go". He kicked the door open and out walked about a dozen more Krauts.

It was getting on toward dark when Cpl Stefanik saw more Krauts trying to get away from town in a vehicle. He knocked the vehicle out. It was burning when we left town. It was 1715 and I got the tank officer and told him we couldn't stay there with no infantry so we backed up to DONCOLS for the night. (Lieutenant Hagar, 773d Tank Destroyer Battalion).

Editors' Note: The attack of a town by an armored unit without infantry support and without definite knowledge of friendly infantry locations is risky business.

However, to overcome the above disadvantages, Lieutenant Hagar made careful foot reconnaissance, coordinated closely with the tank platoon, and took very aggressive action.

776TH TANK DESTROYER BATTALION (SP):

Fort Simserhof is located at 711518, on commanding ground. The construction is such that its guns are easily capable of firing to each of its flanks as well as giving perfect coverage of the ground to its front. Its excellent observation posts in the concrete cupolas on the top of the Fort give the enemy a decided advantage over any direct fire weapon, which makes it almost impossible to secure a position to fire on the Fort that cannot be observed.

Company "A", 776th Tank Destroyer Battalion, in support of the ___ Infantry Regiment, ___ Infantry Division, whose sector is completely dominated by this Fort, was given the mission of firing on the apertures and neutralizing the guns. After an extended reconnaissance two positions were selected. The Fort could be plainly seen from these positions at a range of 2100 yards. A bull-dozer dug the gun positions at night, and the gun positions were further built up with logs and sand bags until nothing but the tubes of the guns could be seen. While the bull-dozer was working, artillery was placed on the Fort to cover the noise of the bull-dozer. This was necessary since the guns were within self-propelled range from the left, rear, and front.

The construction of these two positions involved the work of 100 men for approximately twelve hours and a bull-dozer for approximately four hours. When the positions were completed, the gun tubes were the only target for the enemy, and it was felt the crew would be able to shoot it out with the Fort without having the M-36s knocked out.

The minute the guns opened up they would be seen, as the flashes were under observation from three sides. To distract the enemy's attention, a fire plan was worked out. "B" Company in position in the vicinity of 706525 and 703529 was to fire on the high ground in the vicinity of 726547 or any other enemy activity to the North to prevent firing on the two dug-in guns. Fire was to be laid down intermittently to discourage enemy tanks or self-propelled guns from occupying this ground with armor, as they had previously run tanks into these general locations. One platoon of "A" Company in position in the vicinity 706514 was to furnish a base

776th Tank Destroyer Battalion (Cont'd)

of fire on the cupolas of the Fort, and was to attract the attention of the Fort. These guns had a hull down position and no effort was to be made by this platoon to conceal their flashes from enemy observation. Artillery concentrations were also planned on the cupolas. A tank was put into position at 721515 and every part of the tank sandbagged but the tube. The tank's phone was tied into the tank destroyer telephone line. While the two tank destroyers were firing, no friendly artillery would be fired at the front of the Fort.

It was decided to open fire with one gun and bring the other gun in after the first gun had been located by the enemy. An observation post was secured about 800 yards from the front of the Fort to sense the rounds for the gunners. The reconnaissance for an observation post was made during daylight and selected in the vicinity of 727521. During the night the observation post was dug in, sandbagged, camouflaged and wire laid. It was occupied at 0600 hours. Two telephone lines were laid from the observation post to the guns with a battery pack radio at the observation post as an alternative means of communication if the wire was shot out. This was a party line consisting of the Battalion commanding officer, the observation post, tank and the two tank destroyers. All parties listened in and could easily communicate with any party without being involved in the mechanism of a switchboard.

About 0830 hours the sun came out, the sky was clear, and it was evident that it would be an excellent day for observation. The shadows were bad about mid-morning so the firing was withheld. At 1100 hours three large apertures were very evident and a large port hole was on the left, which indicated a smaller artillery gun or large caliber machine gun. At 1145 hours one tank destroyer opened fire on the center aperture with high explosive super-quick fuze with the tank observing the rounds to locate the target. Later the second tank destroyer took the left aperture under fire.

A total of 122 rounds of high explosive, 14 T-105, and 74 armor piercing cap were fired at the three apertures and port hole. Once a round of high explosive delay went into the aperture an exact estimation could not be made of the results or the exact part of the aperture hit. It generally produced a flame that covered the entire aperture and a great deal of smoke and debris could be seen. The T-105 fuze seemed to produce a greater blast and flame and its effects were even more difficult to assess than the high explosive delay. The armor piercing cap could be observed more easily and rounds were seen from the observation post that appeared as hits right in the center of the aperture. It is estimated that about 30 percent of all rounds fired were direct hits within the apertures with the balance being in the close vicinity of the apertures. Quite frequently near hits on the sides of the aperture would cause debris to fall into and on the base of the aperture. Both tank destroyers were used since there was such a small difference in their gun-target line that both guns were equally effective.

A great amount of physical work, thorough reconnaissance, and careful planning made it possible to successfully execute this mission. (Commanding Officer, 776th Tank Destroyer Battalion). (Contributed by Commanding Officer, 5th Tank Destroyer Gp)

808TH TANK DESTROYER BATTALION (TD ED):

a. An example of coordination of fires was evidenced on 4 December when the Battalion supported an attack of the ___ Infantry to seize the high ground North and East of PFARRERSVILLER. The night of 3 - 4 December 16 3" guns from A and B Companies were put in position on the high ground West and Southwest of PFARRERSVILLER with the help of light tanks. Twelve caliber .50 machine guns from B and C Companies were also dug in to deliver supporting fires. The Battalion and each company established OP's and a forward observer team from each A and B Companies, equipped with SCR 610 radio, was attached to the attacking infantry. Fires were scheduled and coordinated by the ___ Direct Support FA Battalion. Overlay of concentrations issued by Division Artillery was used by all units to designate targets and locations. A 15-minute preparation was fired (direct fire) from H-15 to H Hour by the 3" guns and a 30-minute preparation from H-15 to H + 15 by the 50s. Thereafter targets of opportunity were fired on call. Requests for fire were radioed from OPs and observers to a forward command post and cleared immediately by telephone (direct line) with the Artillery. In one instance approximately 25 Germans were observed retreating over a hill. Our guns could not fire on the target and our observer called for and adjusted artillery fire with excellent results. Information as to the progress of the attack and advanced elements was forwarded immediately to the artillery which relayed it to CP and Division Headquarters. Because of our communications such information reached the Division CT considerably ahead of reports from their) units. (Commanding Officer, 808th Tank De)oyer Battalion.

b. Recently this battalion was employed as part of a Task Force protecting the right flank of Corps along the Moselle River. Direct fire positions were taken on high ground overlooking the river and guns carefully dug in, camouflaged and sighted to cover possible river crossings and road networks and other tank approaches on the East side of the river. Shelters for the crews were dug in or utilized to provide complete protection against enemy fire. OPs were established for each gun. These also were selected so that they could be manned under fire. OPs were manned continually and activity around the guns was prohibited during the day. After several weeks seven enemy tanks appeared across the river counterattacking to the South in the sector of the adjacent infantry division. They were observed by our OPs and taken under fire by the 2d Platoon of "B" Company at extreme ranges. Three tanks were knocked out, the remainder dispersed and the counterattack was repulsed. Two of the tanks were knocked out by the No. 2 gun, Sgt Odell Weems, gun commander, and Cpl Herbert E. Latta, gunner; the other tank was destroyed by the No. 4 gun, Sgt James E. Kennedy, gun commander, and Cpl Hugh Webster, gunner. The ranges were between 4300 and 4500 yards. Almost immediately that Sgt Weems' position was disclosed, it drew fire and during the entire engagement was subjected to very intense mortar and artillery fire, both direct and indirect, in excess of 100 rounds falling in the immediate vicinity of the gun. A fragment tore a hole in Sgt Weems' helmet and one went through Cpl Latta's clothing, scratching him slightly. Nevertheless both men stayed with their gun until the tanks were dispersed. The fact that the guns and OPs were well dug in made the positions tenable in the face of terrific fire. (S - 3, 808th Tank Destroyer Battalion).

SECTION III

TANK DESTROYER TACTICS

1. FIVE DESTROYERS PER TANK DESTROYER PLATOON?

We should have five tank destroyers in a platoon. Since one tank destroyer is useless without supporting fire from another, and since we do have vehicular casualties, the platoon loses a whole section when one vehicle is out. If there were five destroyers, one casualty would still leave two sections operative. The fifth destroyer would, in addition, be the platoon leader's vehicle. Too often the platoon leader takes unnecessary risks by making dismounted trips, rather than take an M-10 from a position. (Commanding Officer, 703d Tank Destroyer Battalion). Editor's Note: How about comments from other units?

2. ASSAULT OF PILLBOXES:

a. Pillboxes are often so well camouflaged that sometimes the only way to locate them is by drawing fire from them. One system of tank-tank destroyer coordination was used successfully by this battalion in DILLINGEN: The tank destroyers took up firing positions so that they could cover several suspected pillbox positions. The tanks would then poke themselves out from protected positions, draw fire and pull back. The tank destroyers could then locate the pillboxes and destroy or at least cause embrasures to be closed. This combines the best points and minimizes the weak points in armor and fire power of both tank and tank destroyer.

b. A good plan of attack is first to close the embrasures by AP and then lob several HE shells around the pillbox to take out any machine guns, anti-tank guns, personnel, etc., who might be outside before infantry or engineers advance to place demolition charges. (Commanding Officer, 773d Tank Destroyer Battalion).

3. ILLUMINATION FOR NIGHT TANK ATTACKS:

To assist infantry in the defense of the village of DAHL, the 610th Tank Destroyer Battalion stationed a platoon among the houses in the village. The platoon commander and infantry battalion commander arranged to divide the village into three sections, any of which were to be illuminated on call by flares from the 60mm mortar. Using this method of illumination, the platoon, commanded by Lieutenant Enoch, knocked out eight tanks in pre-dawn attacks at ranges from fifty to two hundred yards. (S - 3, 610th Tank Destroyer Battalion).

4. TANK DESTROYER COVERING A ROAD:

Don't block a road from the road. Get off to the flanks and get flanking fire on the road. (Commanding Officer, 703d Tank Destroyer Battalion).

5. ENEMY ARTILLERY AND MORTAR FIRE:

a. In a town heavy artillery fire preceding German attacks caused heavy casualties among tank destroyer crew members. To remedy this situation, destroyer crews dismounted from their vehicles as the artillery barrage began and as soon the firing ceased again occupied their vehicles in time to drive off enemy infantry and tank attacks.

b. In giving close support to infantry units, the M-36 tank destroyer has drawn a considerable amount of mortar fire. Working with the artillery, tank destroyers have moved into position by the following method: The artillery would fire two rounds every two minutes for ten minutes at the vicinity of the location of the German mortars. This harassing of mortar crews, plus the noise of the artillery, enabled the tank destroyers to occupy positions without drawing mortar fire. (S - 3, 610th Tank Destroyer Battalion).

6. POOLING MINE DETECTORS:

At the suggestion of Lieutenant Napier, our Pioneer Platoon Leader, all mine detectors of the battalion were placed in his platoon. From this platoon, he formed four crews whose job is mine detecting and removal, booby trap removal, and the placing of demolitions on pillboxes. One of these crews is assigned to each tank destroyer gun company, the fourth remaining with the balance of the platoon in the reconnaissance company, awaiting call where additional help is needed. (Commanding Officer, 773d Tank Destroyer Battalion).

7. SCR 300 RADIO FOR USE IN THE TANK DESTROYER PLATOON:

In the support of an infantry battalion an SCR 300 radio for use in the tank destroyer platoon greatly facilitates the coordination between the tank destroyer platoon leader, the infantry battalion commander, and the infantry company commander. Company "B", this battalion, has successfully used two SCR 300 radios for this purpose. The radios were furnished to the company by the infantry battalion it was supporting. Prior to an attack, normally, the tank destroyer platoon leader has his platoon in a position to fire on likely targets. Often the infantry elements in the attack encounter enemy resistance in the form of strongpoints which the tank destroyers are not covering. Through the SCR 300, the tank destroyer platoon leader can be notified of the location and the type target. Prearranged signals should be improvised in the event the radio fails to function. (Officers, Company "B", 654th Tank Destroyer Battalion).

8. USE OF AIR OBSERVER IN TANK DESTROYER BATTALION:

This officer does full-time duty as an observer at the Divisional air strip and by placing the battalion channel crystal on one of the channels of the SCR 610 radio set of divisional artillery planes, the same observation facilities of the field artillery battalion are secured for the tank destroyer battalion.

The battalion Air OP Officer takes care of the duties of a divisional artillery observer, flying his share of the daily air patrol, but he is also a tank destroyer officer flying over the assigned sector of his battalion. He has constant daily contact with the pilots and observers of the division and is in the best position to insure that the aerial observation and reconnaissance requirements of the tank destroyer battalion are immediately brought to the attention of the planes about to take off and already in the air. From his place in the operations room, he can sift out and evaluate information from the patrol reports and radio traffic and phone it in immediately to his battalion. Before he goes up he contacts his battalion and talks to the S-2 and S-3 to find out if they have any special instructions for him.

The experience of this battalion has proven that aerial observation can help a tank destroyer battalion in the following ways:

a. Supplement and extend the limits of route and area reconnaissance available to the battalion

b. Provide a warning system both in the approach march and fire fight which is particularly effective in an obscure or fast moving situation.

c. Improve communication by acting as a relay station.

d. Provide an essential means of fire adjustment for the battalion's flat trajectory pieces when it is filling the role of artillery. (S-3, 776th Tank Destroyer Battalion).

9. TANK DESTROYERS IN ITALY:

A recent conference of tank destroyer officers in ITALY resulted in the following comments:

a. Coordination:

The conference stressed that coordination and cooperation were the essence of all tank destroyer employment. These are difficult to achieve, being based on mutual respect and understanding, but once attained, they pay tremendous dividends in results gained.

b. Antitank:

In this theater, the German rarely has employed his armor independently. It is employed usually to support infantry attacks. This makes it imperative that the tank destroyers be placed well forward in the infantry lines. This type of employment has given rise to many special considerations, some of which are as follows:

(1) Selection and occupation of position, must be coordinated closely with the front line infantry commander. He is reluctant, frequently, to have the tank destroyers in his position, because they draw fire. Unless the tank threat is paramount, the tank destroyer usually gets out of his way and takes a less satisfactory position.

(2) Crews of tank destroyers so emplaced should be rotated frequently because they are under constant small arms, machine gun, mortar and artillery fire.

(3) Close coordination with the infantry antitank guns is essential, but is very difficult to obtain and maintain.

c. Air OP Section Comparable to that of an Artillery Battalion:

The Air OP is of vital necessity to the battalion not only for adjusting artillery fires but for route reconnaissance, march control, reconnaissance of close-in terrain, directing action of reconnaissance patrols, personal reconnaissance, liaison, augmenting tank warning service and directing combat.

SECTION IV

INTELLIGENCE NOTES

1. ENEMY EQUIPMENT:

a. TELLERMINES LAID ON SPRINGS (War Department Technical Intelligence Summary #155, 6 December 1944).

An unusual method of laying Tellermines (Piltz) 43 in a road has been reported encountered on the Western Front. Each of the mine mines concerned was placed on top of a three-coil spring, and a board was laid over the mine. The road surface was carefully replaced over these boards. It appears that the purpose of this device was to allow light vehicles to pass without setting off the mine. In fact, several 1/4-ton trucks passed over the mines before their discovery, the weight apparently being taken up by the boards and springs.

b. S-MINE DISCHARGER MOUNTED ON TIGER TANKS (Intelligence Bulletin, Volume III, No. 2, October 1944).

In an effort to combat attacks by tank hunters, the Germans have fitted the Tiger tank with S-mine dischargers, which are fired electrically from the interior of the tank. These dischargers are mounted on the turret, and are designed to project a shrapnel anti-personnel mine which bursts in the air a few yards from the tank. Thus far these dischargers have only been noted on Tigers, but they could be installed on other tanks.

c. GERMAN TANK TRENDS (Intelligence Bulletin, Volume III, No. 2, October 44).

There is good reason to believe that the German tanks which will be encountered most frequently in the near future will be the Pz Kpfw V (Panther),

c. German Tank Trends (Cont'd)

the Pz Kpfw VI (Tiger) and the Pz Kpfw IV. However, the Germans have a new 88mm (3.46-inch) tank gun, the Kw K 43, which is capable of an armor-piercing performance greatly superior to that of the 88mm Kw K 36. According to reliable information, the Kw K 43 is superseding the Kw K 36 as the main armament of the Tiger. A new heavy tank, which has been encountered on a small scale in northwestern France, also is armed with the Kw K 43. This new tank looks like a sealed-up Panther, with the wide Tiger tracks.

There was a sharp rise in the rate of production of Pz Kpfw IVs during 1943. Moreover, the front armor of the Pz Kpfw IV has been reinforced from 50mm (1.97 inches) to 80mm (3.15 inches) by the bolting of additional armor to the nose and front vertical plates. And the 75mm (2.95-inch) tank gun, Kw K 40, has been lengthened by about 14-3/4 inches. All these developments seem to indicate that the Pz Kpfw IV probably will be kept in service for many months.

Early in 1944 a number of Pz Kpfw IIIs converted into flame-throwing tanks appeared in ITALY. Nevertheless, it is believed that production of this tank ceased some time ago. It is extremely unlikely that production of Pz Kpfw IIIs as fighting tanks will ever be resumed, no matter how serious the German tank situation may become.

A modified Pz Kpfw II (Lynx) has been designed as a reconnaissance vehicle.

2. GERMAN TACTICS:

a. HOW TO FIGHT PANZERS: A GERMAN VIEW (Intelligence Bulletin, Volume III, No. 2, October 1944).

An anti-Nazi prisoner of war, discussing the various methods of combating German tanks, makes some useful comments. Although they are neither new or startling, they are well worth studying since they are observations made by a tank man who fought in ITALY.

"When dealing with German heavy tanks, your most effective weapon is your ability to keep still and wait for them to come within effective range. The next most important thing is to camouflage your position with the best available resources so that the German tanks won't spot you from any angle."

"If these two factors are constantly kept in mind, the battle is half won. Movement of any kind is a mistake which certainly will betray you, yet I saw many instances of this self-betrayal in ITALY. Allow the enemy tank to approach as close as possible before engaging it--this is one of the fundamental secrets of antitank success. In ITALY I often felt that the enemy opened fire on tanks much too soon. Their aim was good, but the ranges were too great, and the rounds failed to penetrate. My own case is a good illustration: if the opposition had held its fire for only a few moments longer, I should not be alive to tell this tale."

"By letting the German tank approach as close as possible, you gain a big advantage. When it is on the move, it is bound to betray its presence from afar, whereas you yourself can prepare to fire on it without giving your own position away. The tank will spot you only after you have fired your first round."

"A tank in motion cannot fire effectively with its cannon; the gunner can place fire accurately only when the vehicle is stationary. Therefore, there is no need to be unduly nervous because an approaching tank swivels its turret this way and that. Every tank commander will do this in an attempt to upset his opponents' tank recognition. If the tank fires nothing but its machine guns, you can be pretty sure that you have not yet been spotted."

"Consider the advantages of firing on a tank at close range:

(1) In most cases the leading tank is a reconnaissance vehicle. Survivors of the crew, when such a short distance away from you, have little chance of escape. This is a big advantage, inasmuch as they cannot rejoin their outfit and describe the location of your position to the main body.

(2) Another tank following its leader on a road cannot run you down. In order to bypass the leading tank, it has to slow down. Then, long before the gunner can place fire on you, you can destroy the tank and block the road effectively. Earlier in the war, a German tank man I know destroyed 11 hostile tanks in one day by using this method."

b. GERMAN TANKS IN ACTION (Intelligence Bulletin, Volume III, No. 2, October 1944).

A German prisoner observes that the following are standard training principles in the German tank arm:

(1) Surprise.
(2) Prompt decisions and prompt execution of these decisions.
(3) The fullest possible exploitation of the terrain for firing. However, fields of fire come before cover.
(4) Do not fire while moving except when absolutely essential.
(5) Face the attacker head-on; do not offer a broadside target.
(6) When attacked by hostile tanks, concentrate solely on these.
(7) If surprised without hope of favorable defense, scatter and reassemble in favorable terrain. Try to draw the attacker into a position which will give you the advantage.
(8) If smoke is to be used, keep wind direction in mind. A good procedure is to leave a few tanks in position as decoys, and, when the hostile force is approaching them, to direct a smoke screen toward the hostile force and blind it.
(9) If hostile tanks are sighted, German tanks should halt and prepare to engage them by surprise, holding fire as long as possible. The reaction of the hostile force must be estimated before the attack is launched.

c. SABOTAGE GROUPS (Intelligence Notes No. 44, SHAEF, 13 January 1945).

Recently a team of 3 enemy saboteurs was arrested in the First French Army sector. The team was one of four which made up a detachment. The detachment operates in a specific sector, and each team has its own sub-section.

The team arrested was to operate in the BELFORT - VESOUL - BESANCON region, and the detachment to which it belonged had as its sector the region BELFORT - REIMS. This team had as its particular mission to sabotage vehicles and fuel dumps (automobile gas trailers or railway tank cars).

Each individual was armed with a pistol (generally hidden in the groin) and three grenades. American combat jackets were worn.

Sabotage material consisted of four bombs and four incendiary plates. The bombs which are magnetic incendiaries, are enclosed in ordinary ration cans (about one kilogram). The plates are carried in a small canvas bag.

The team generally contacts an outpost. Its members declare that they are prisoners or requisitioned workers who had escaped from GERMANY, having passed the German lines with great difficulty. They possess numerous papers certifying that they have been employed in such and such a factory or in such and such a detachment of workers.

With their boxes of explosives they have a can of rations which they freely offer to the soldiers who accept it. Having passed the lines, they avoid the main lines of communication and proceed as quickly as possible to the centers and busy places in their assigned sector. The bomb is fastened underneath the vehicle; it may be exploded immediately or the bomb may also explode as a result of vibration while the vehicle is in motion.

d. ENEMY CAMOUFLAGE (Third United States Army G-2 Periodic Report #230, 27 January 1945).

SHAEF reported captured Panther tank camouflaged to resemble US M-10 motor carriage. Method of camouflage was not a field expedient. Front and rear of tank were fitted with sheet metal and turret was covered to give tank correct silhouette. Cupola was removed. All US markings were correct. Gun and other features were normal for Panther. Tanks operating with 150 Panzer Brigade have previously been reported camouflaged to resemble US models.

3. INTELLIGENCE SUMMARY ON OUR FRONT:

The last week of January witnessed the final reduction of the ARDENNES "bulge". Tank destroyers figured heavily in both the checking of the ARDENNES counter-offensive, and the reduction of the "bulge". Of the 800 enemy tanks claimed from all sources in the South portion of the bulge, 200 were destroyed by tank destroyer action.

3. Intelligence Summary on our Front: (Cont'd)

Of the eleven Panzer-type divisions committed in the "bulge", only three (the 9th, 130th Panzer and 15th Panzer Grenadier) remained in contact on 28 January. The total tank strength of these three divisions is estimated to be 70 tanks. Also on 28 January, all the major elements of the 11th Panzer Division, with an estimated tank strength of 50 tanks, remained in contact in the SAAR-MOSELLE triangle. (S - 2, 1st Tank Destroyer Brigade.)

The 1 SS, 2 SS, 9 SS, 12 SS, 2d and 116th Panzer and the 3d Panzer Grenadier Divisions, with a combined estimated total of 175 tanks, are reported "out of contact" on the Western Front. It is possible that some of these divisions will be shifted to the Eastern Front, but it is more likely that the bulk of this armor will be reorganized behind the Siegfried Line for commitment against an Allied penetration of the West Wall.

SECTION V

TECHNICAL NOTES

1. METRO MESSAGES:

Recently we have been issued a booklet containing excerpts from unpublished Firing Tables for Gun, 3", M 5 and M 7 (FT 3-M-1). These tables are complete and with them corrections may be computed from metro data. Metro messages are now given to our company FDC's three times daily and metro corrections used on all missions. The use of metro data has increased the accuracy of our fires considerably. (S - 3, 808th Tank Destroyer Battalion).

2. DISPERSION OF 3" HE (Reduced Charge):

Considerable range dispersion has been observed in the Shell, 3", HE (Reduced Charge), M 42 and Mods W. Fuze PD M 48 and Mods. During the period 5 January - 14 January "C" Company, employed as reinforcing artillery, made 16 registrations with this ammunition on a base point at approximately 5000 yards. It was noted that frequently 50 to 75 yards range dispersion resulted with same quadrant setting. Since 14 January care has been taken to seat the powder in the shell always in the same manner. This appears to have reduced the dispersion about 50%. (S - 3, 808th Tank Destroyer Battalion). Editor's Note: Probable error 3" reduced charge at 5000 yards is 28 yards.

3. ACCURACY OF 3" GUN:

An example of the accuracy of the 3" gun was evidenced on the night of 14 January when "C" Company, in the role of reinforcing artillery was called upon to deliver emergency fires on a troop concentration. The target was over 800 mils outside of transfer limits, requiring a shift of 1612 mils, and over 12,000 yards in range. A K of ⁄ 78 yards per 1000 was used. A check round fired at the target in the morning showed that the deflection was correct, range 100 short. (S - 3, 808th Tank Destroyer Battalion).

4. SETTING ILLUMINATING SHELL FUZE:

The combination tool for caliber .50 machine gun may be used for setting the fuze on the Shell, Illuminating, Mk 24 Mod. 1 (Navy).

5. THE USE OF "FORK" INSTEAD OF "C" WITH 90MM GUN:

We have found that in indirect fire precision adjustment with the 90mm gun, its large probable error made the use of C in adjusting unsatisfactory, while the use of the Fork gave us satisfactory adjustments. (Commanding Officer, 607th Tank Destroyer Battalion).

6. THREE-INCH ILLUMINATING SHELL:

"Observers report that it is easy to adjust fire on any target disclosed by the 3" star shell, Navy, fuze M-54 (See Battle Experiences No. 11, 15 December 1944). Best results were obtained by firing a series of four rounds at ten seconds intervals, with a fifty mil shift in deflection for each round. An area about four hundred yards square is effectively lighted by each round, using a burst height of 1100 feet." -- Executive Officer, 634th Tank Destroyer Battalion (Extract from Battle Experiences).

7. T-105 FUZE:

As regards the T-105 fuze, the Commanding Officer, 258th Field Artillery Battalion states: "HE Shell, Fuze T-105 does not obtain its maximum effectiveness at ranges under 2,000 yards if super charge is used. Considerable evidence exists that the shell begins to shatter into large fragments slightly before the delay fuze becomes operative, when the terminal velocity is excessive. This was countered effectively in the last stages of a mission requiring destruction of a series of pillboxes when, by firing normal instead of super charge at shorter ranges, the penetration was found to be better.

This matter has not been thoroughly explored and its possibilities are offered as a subject for further study. This experience agrees with that of the 991st Field Artillery Battalion engaged in a similar mission with the VII Corps.

The above is of particular interest when considered in connection with the articles about the T-105 fuze in the June 1944 (page 71) and the July 1944 (page 68), issues of the AIS, wherein it is stated that the greatest effect will be obtained when the terminal velocity is between 1,400 and 2,150 feet per second. It appears that 2,000 yards is a critical range using super charge since the terminal velocity at that range is approximately 2,150 feet per second. (Artillery Officer, First Army).

8. 76MM AND 3-INCH FLASHLESS AND SMOKELESS POWDERS:

a. A year ago in England, the 7th Tank Destroyer Group noticed that for no apparent reason some 3" ammunition gave lots of smoke but no flash, while other 3" ammunition gave no smoke but a big flash. Ordnance was queried at the time but could offer no solution.

The question was finally answered by Ordnance Technical Bulletin No. 1, dated 2 January 1945, and Change No. 1 thereto, dated 11 January 1945.

Since the "flashless" powder produces so much smoke that the target is hidden from the gunner, and since tank destroyer units would rather have a single type ammunition, it has been requested that all 76mm and 3" ammunition issued Third United States Army tank destroyer units be of the "smokeless" type. It was further requested that depots stock 10% "flashless" ammunition to be drawn for special missions when flash is highly undesirable.

b. Since reduced charge ammunition is also produced with both "smokeless" and "flashless" propellants, information in "a" above applies to reduced charge as well as to normal charge. (1st Tank Destroyer Brigade).

9. PANORAMIC TELESCOPES FOR THE M-36 TANK DESTROYER:

a. It is expected that during the month of February, production schedules will be sufficiently high to fill requirements for Mount, telescope, T104E1, for installation on Carriage, Motor, 90mm Gun, M36 and M36B1, not so equipped.

b. Requisition has been placed for sufficient Mounts, telescope, T104E1, and corresponding telescopes, Panoramic, M12 for all Carriages, Motor, 90mm Gun, M36 and M36B1, being received by this theater without subject equipment. (Twelfth Army Group).

10. RECOIL MECHANISM TEST -- M-36 TANK DESTROYER:

"On December 11 and 12 the 776th Tank Destroyer Battalion conducted a test to determine the maximum rate of fire for an M-36 in its secondary role as artillery. The gun was carefully leveled and the recoil cylinder filled. When the cylinder was filled the tube was depressed to get all air out of the recoil system, then again leveled and filled. Nine ounces of oil were removed from each cylinder and the gun was put into position. Thirty-six rounds were fired in 18 minutes and the recoil system functioned efficiently. At the 35th round it was noted the gun was not going into battery as efficiently as in previous rounds, and at the 36th round the gun remained about one inch out of battery. The gun was allowed to cool for 50 minutes and a firing schedule of one round every two minutes was undertaken. This was continued for 50 minutes with the gun operating efficiently. The 21st round failed to put the gun into battery and it was found that by depressing the tube the gun would go back into battery. No more oil could be removed from the recoil without endangering the recoil system and the firing was discontinued at this time.

10. RECOIL MECHANISM TEST -- M-36 TANK DESTROYER (Cont'd):

The recoil system functioned smoothly with the nine ounces of oil removed from the recoil cylinder. This was on the border line for safe firing with this gun and due to the mechanical variation between recoil systems it is not considered advisable to remove 9 ounces from each recoil cylinder.

During this firing the ordnance personnel remained in the turret and closely observed the reaction of the recoil system and at the conclusion made the following recommendations:

1. Six ounces of recoil oil be removed from each recoil cylinder before firing artillery missions.

2. The maximum rate of fire for the M-36 for artillery missions should not exceed 20 rounds per hour." (Special Report, 776th Tank Destroyer Battalion, 18 December 1944).

11. BRITISH M-10 MODIFICATIONS:

As protection against mortars and hand grenades dropping into the open turret, and against German "bazookas" and rifle grenades penetrating the thin armor, the following modifications have been made on the M-10:

a. A make-shift turret has been adopted. The turret is made of 1/4-inch armor plate (mostly from German armored cars), and covers the entire top. It has two hatches - one over each side of the gun breech - for getting in and out. There are two openings, approximately four inches wide and ten inches long, on the sides for visibility. For additional visibility, an M4 tank periscope with 360° traverse has been installed in the top of the turret on the side of the gun commander. This enables the gun commander to locate targets. An open sight also has been welded on the gun shield. This is aligned with the direct sight. The gun commander can locate targets with the periscope, command the gunner to traverse right (or left) while he holds the periscope until the open sight is aligned through the periscope on the target. The gunner can then pick up the target with his direct sight and open fire at the estimated range.

b. An additional sheet of armor - 1/2-inch thick - has been bolted on the front and sides of the M10. This is spaced at 3/4 of an inch. The bolts already on the M10 make this a simple modification, and although no tests have been made, the regimental commander and all company commanders believe the additional 1/4-inch of armor with the spacing is sufficient protection against enemy "bazookas" and rifle grenades.

Another modification which has proven practical is the shifting of the knob on the traversing hand-wheel one inch closer to the center of the wheel to increase the speed of traversing. (73d Antitank Regiment, Second British Army).

12. CAMOUFLAGE OF M-10 TANK DESTROYERS:

A lime, water and salt mixture, to form a whitewash, was used, but was unsatisfactory.

Our supply officer obtained some white camouflage paint. This paint was mixed with fifty percent (50%) water, and the solution was brought to a boil. This mixture was sprayed on the destroyers by means of the oil spray guns which were issued with the second echelon tool sets. This type spray gun covers a larger surface and allows more control over the spray. The regular type of paint spray gun was not satisfactory due to the fact that it clogged very easily. The white camouflage paint for this purpose is far superior to the ordinary lime and water whitewash. The amount of time required to paint an M10 tank destroyer is approximately two (2) hours. A crew of three men works very satisfactorily -- one man mixing and taking care of the fire, while the other two men apply the paint. Great care must be taken in applying the paint to the suspension system and around the rear end of the vehicles.

After proper application of the white camouflage paint, the vehicles are very hard to detect against a white background. (Battalion Motor Maintenance Section, 894th Tank Destroyer Battalion).

13. PREVENTATIVE TIRE MAINTENANCE:

Early in December we inaugurated a program of preventative tire maintenance. Both drivers and car commanders were imbued with the spirit of the program. Tires are closely inspected after each trip. As often as is practical, all tires are washed, in order that a more thorough inspection for foreign particles may be made. Any particle that might injure the tire or puncture the tube is removed. We formed a battalion tire inspection team consisting of three men and an officer. This team consists of tire specialists. They remove each tire from a vehicle, clean it thoroughly, inspect it and remove all foreign particles such as nails, pieces of shrapnel, cartridge cases, etc. Tires when replaced are rotated if deemed necessary. Worn tires are replaced when replacement tires are available. Tires that can be recapped are taken off and sent in for recapping before they are worn to the extent that they cannot be recapped. Tire pressure and the proper adjustment of chains are checked daily. We are profiting by far less tire trouble. (Tire Inspection Team, 654th Tank Destroyer Battalion).

14. STOWAGE LIST:

TB 9-755-13, dated 2 August 1944, which has just been received, gives the latest equipment stowage list for the M-18 and the T-41. (1st Tank Destroyer Brigade).

SECTION VI

FIELD EXPEDIENTS

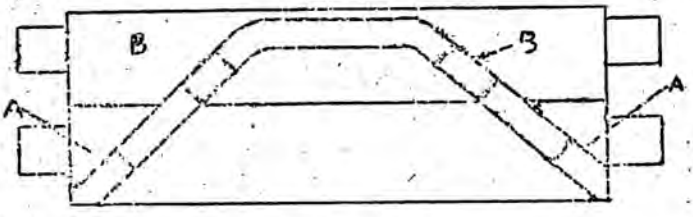
1. TRACTION DEVICES FOR ICY ROADS:

a. The need for additional traction devices for the M-36 destroyer with steel track became apparent to this organization after the extreme cold weather and snow. After some tests and experimentation it was decided that the welding of stainless steel knobs, 9 knobs per chevron, gave additional traction on hard glazed ice. A test was conducted using plain chevrons, rubber, and knobed chevron tracks. The knobed chevron far out-performed the other types under all conditions tried. It is recommended that Stellite welding rod be used for the job, and as a substitute, stainless steel rod be used. (Materials needed - 7 pounds of rod per track). (S-3, 607th Tank Destroyer Battalion).

b. M-10 grousers were cut with an acetylene torch giving a saw-tooth edge with about 1 inch to 1½ inch tooth. Five of these were cut for each track and put on in the normal way at regular intervals. M-10s with these modified grousers moved up and down the steepest icy grades without dangerous sliding. (Commanding Officer, 773rd Tank Destroyer Battalion).

c. This unit in conjunction with personnel of the 501st Ordnance Battalion, have constructed and are installing the modification to M-36 tracks shown below. This installation has proved very satisfactory in that traction is gained and the danger of side slipping is greatly reduced.

PLATE I



A - Tips removed by acetylene cutting torch.
B - These tips are then welded to the upper part of chevron, thus forming two projections approximately one inch long, located at a diagonal to the axis of the track block, giving both traction and eliminating side slipping. Point "A" can be eliminated if one-inch bar stock is available, thus saving cutting tips off chevron.
(S-3, 610th Tank Destroyer Battalion).

2. MUFFLERS FOR THE M-36:

The need for muffling the exhaust noise of the M-36 destroyer brought about the experiment of mounting mufflers for M-4 tractor on the M-36 destroyer. The original mounting was made with welded 105 howitzer cases as a conduit and by mounting the muffler on the rear armor apron of the destroyer. The effect of muffling was not what was desired, but resulted in a material reducing of the loud noise of the exhaust. It is felt that this particular mounting is extremely vulnerable to operational activity of vehicles and that the mufflers, if mounted on the rear deck and connected with flexible metal tubing would result in less operational damage and ease in installation. (Materials needed - strap iron for clamp, 12 feet of 4" flexible steel tube, 2 mufflers for M-4 tractor per destroyer). (S - 3, 607th Tank Destroyer Battalion).

3. ALCOHOL TO PREVENT FREEZING OF GAS LINES:

The addition of from one-half pint to one pint of alcohol to a tank of gasoline in a half-track (30 gallons) prevents freezing of water in gas lines. Water that may be in the gas tank mixes with the alcohol and the water-alcohol mixture will not freeze. More alcohol should be added each time the gas tank is filled. (Commanding Officer, 808th Tank Destroyer Battalion).

4. COTTON TO PREVENT FROSTING OF SIGHT LENS:

It has been found that putting cotton against a sight lens underneath the sight cover prevents the lens from frosting on a cold, damp night. (S - 3, 610th Tank Destroyer Battalion).

5. BULLDOZERS TO PREPARE GUN POSITIONS:

Recently in a stabilized situation covering a broad front we have been able to employ engineer bulldozers to assist in digging gun positions. At least two alternate positions have been prepared for each gun of each platoon. (Commanding Officer, 808th Tank Destroyer Battalion).

6. OCCUPATION OF POSITION:

In giving close support to the assault battalion of the ____ Infantry Regiment in the advance toward VLANDEM, the 3" towed guns of my platoon had to move forward to a position near the top of a very steep hill. The presence of ice and drifted snow made it impossible for the half-track prime-movers to pull the guns up the obstructed slope. I contacted one of the supporting tanks and this tanker allowed me to couple my towed guns to his tank and towed them up the slope to the positions I had previously selected. (Lieutenant Deddens, Company "A", 802d Tank Destroyer Battalion).

7. SIGHT DIAGRAM CHART:

The Aiming Data Chart showing sight diagram and range lines for APC, HE, and HVAP were pasted on the shields of all guns and coated with shellac. The paper could not be made entirely impervious to weather and the shield was usually covered with mud. Accordingly we painted an abbreviated scale on the left side of the mantlet in white letters, 1 1/2 inch in size, thus:

APC	HE	HV
8	9	13
16	18	23

By interpolation the gunner can readily approximate the other ranges. The chart has been pasted in the gun chest. (Commanding Officer, 808th Tank Destroyer Battalion).

8. ALIGNING THE SCR-610:

We have been unable to obtain alignment equipment ME 73 or ME 13. Adaptors M-399 were not available as per authorization so we took a panel meter from a BC-659, mounted it and the adapter M-399 on bakelite and used them to align the SCR-610. Each company with these now make speedy and reasonably accurate alignment. The adaptors were requisitioned and the panel meters are available at salvage. The connections are the same as regular installation in BC-659. (S - 3, 808th Tank Destroyer Battalion).

SECTION VII

CHANGES IN TABLES OF ORGANIZATION AND EQUIPMENT

ADDITIONAL AMMUNITION TRUCKS FOR M-36 BATTALIONS:

Because 90mm ammunition is considerably heavier than 3" or 76mm, the Table of Equipment vehicles are insufficient for transporting the ammunition of an M-36 battalion. To remedy this condition, it was recommended that the Third United States Army M-36 Tank Destroyer Battalions be provided with an additional four 2 1/2-ton trucks and 1-ton trailers for the battalion ammunition train. Recommendation could not be approved due to shortage of 2 1/2-ton trucks. (S - 4, 1st Tank Destroyer Brigade).

SECTION VIII

COMBAT TIPS

1. DECEPTION:

A 3" gun was knocked out by direct hit from a 120mm mortar (fortunately, no crew members were injured). The gun has been evacuated for repair and a dummy constructed in its place. The battalion is careful that the Germans see activity around this gun position each day. As a result of this deception, the Germans are wasting about 20 rounds of heavy caliber mortar ammunition on this position daily. (Commanding Officer, 774th Tank Destroyer Battalion).

2. GETTING THE MOST OUT OF THE BAZOOKA:

These things will help to develop aggressive and efficient use of the bazooka:

a. Select aggressive men.
b. Make the bazooka their primary weapon. Give them only a pistol in addition.
c. Put bazooka teams for training and operation under a noncommissioned officer who has used a bazooka in battle and believes in it.
d. Give bazooka personnel special training to include the following:
(1) Vulnerable points on hostile tanks.
(2) Emplacing the bazooka to obtain concealment and surprise.
(3) Tank stalking. This should be by patrols of two bazooka teams and a rifle squad with several submachine guns.
e. In combat, use your bazookas in pairs under company control unless a special situation makes another method necessary. (Executive Officer, 334th Infantry Regiment -- Extract from "Battle Experiences").

3. DON'T LINGER NEAR CAPTURED PILLBOXES:

Recommendation by Captain John J. Kelly, then Commanding Officer of Company "C", 773d Tank Destroyer Battalion: "Do not let men move around close to captured pillboxes which are within German artillery range. The first round fired generally lands right on the pillbox which indicates that they are carefully zeroed in on all of them". (Commanding Officer, 773d Tank Destroyer Battalion).

4. TOPS FOR DESTROYERS:

In stationary situations M-10s are dug in until only the turret protrudes above the ground. This is the only way excessive casualties from enemy artillery fire can be avoided. The crew's dugout is under the vehicle and the crew enters and leaves the vehicle through the escape hatch. Tops made of boards covered with sandbags protect the crew against airbursts and mortar shells. (Commanding Officer 702d Tank Destroyer Battalion).

5. SECURITY POSTS:

I like to set up security posts as follows: Use a machine gunner, a bazooka man, and a rifleman. Have them dig a V-shaped trench large enough for all men and from which the bazooka and machine gun can be fired. Provide half the trench with overhead cover. Arrange for communication to the organization and require it to be tested frequently. (Sgt J. A. Govaert, 821st Tank Destroyer Battalion -- Extract from "Battle Experiences").

6. EASING BATTLE STRAIN:

One way we used to ease the strain on a man's nerves was to pass around among the entire platoon all radio messages, regardless of what they were. It kept them busy and gave them something to think about. (Commanding Officer, 703d Tank Destroyer Battalion).

SECTION IX

TRAINING REINFORCEMENTS

BATTALION ORIENTATION COURSE FOR REINFORCEMENT PERSONNEL:

In order that reinforcements coming to this Battalion may readily feel they have found a "home", and so as to indoctrinate and engender pride in themselves, their status, and the organization of which they are now a part, we have set up an orientation course for all reinforcement personnel. The course is carried on mainly through the Headquarters Commandant under the direction of the Battalion Commander and his staff. They are brought up to date on such subjects as the history of the organization, the tank destroyer organization, the mission of a tank destroyer battalion, duties of members of the tank destroyer battalion, duties of members of the tank destroyer crew, mechanical training, types of ammunition and uses, the bazooka, map instructions, identification of enemy vehicles and vulnerable points, personal maintenance, supply discipline, the combat soldier and current battle experiences. As a result, we will have no "new" men going into the line. (Commanding Officer, 644th Tank Destroyer Battalion).

SECTION X

WARRANT OFFICERS

As yet, nothing definite has been established concerning the appointment of Warrant Officers. However, it appears that an applicant will be required to pass a written examination in order to be placed on the ETOUSA eligibility list. Then as Warrant Officers are required through normal requisitions, Warrant Officers will be appointed to fill necessary vacancies.

If a unit has both a vacancy for a Warrant Officer and an enlisted man who is on the eligibility list and this fact is stated on the requisition, it is probable that the enlisted man will be appointed and retained by the unit.

Complete and definite instructions will be issued shortly. (S-1, 1st Tank Destroyer Brigade).

SECTION XI

INFORMATION -- EDUCATION PROGRAM

Major Arthur P. Nelson, S-2, 1st Tank Destroyer Brigade, has been appointed Brigade Information -- Education Officer. Major Nelson recently attended the Army Information -- Education Staff School, Army University Center. This school is operating under the provisions of paragraph 6 f, Theater SOP 48 and paragraph 8 AG letter 322 OpSS, 2 November 1944, to train personnel to initiate and administer the Army Educational Program. In the near future all tank destroyer battalions will receive a quota of at least one officer per battalion to attend the school.

The Army Education Program is divided into two phases. Phase I consists primarily of keeping the soldier informed and oriented on the progress of the war in all theaters, on current news of the "home front", and on the general problems that confront both the individual soldier and the world at large. Phase I is in effect now and will continue throughout the period of active operations.

Phase II is that part of the Army Training Program not directly related to the performance of military duties or supervised recreation, but represents an expansion of the present off-duty education program. Phase II is to be inaugurated in the theater as soon as the military situation permits after the defeat of Germany.

SECRET

SECTION XII

TANK DESTROYER TROOP LIST

The latest available list of Tank Destroyer Brigade, Groups, and Battalions, with their commanders, is furnished for your information below.

BRIGADE

1ST TANK DESTROYER BRIGADE -- Colonel LOGAN C. BERRY

GROUPS

1st TD Group	-	Colonel STEVENS	8th TD Group	-	Colonel LARTER
2nd TD Group	-	Colonel ELMS	9th TD Group	-	Lt Col DARLING
3rd TD Group	-	Lt Col MAYS	12th TD Group	-	Colonel DERRY
4th TD Group	-	Colonel BROWNING	14th TD Group	-	Colonel HADDOX
5th TD Group	-	Colonel JACOBY	16th TD Group	-	Colonel WHEATON
6th TD Group	-	Colonel SEARCY	20th TD Group	-	Colonel SARGENT
7th TD Group	-	Lt Col BRONTE	23rd TD Group	-	Colonel Martin

BATTALIONS

601 TD Bn	-	Lt Col TARDY	704 TD Bn	-	Lt Col BIDWELL
602 TD Bn	-	Major CONLIN	705 TD Bn	-	Lt Col TEMPLETON
603 TD Bn	-	Lt Col McCURRY	771 TD Bn	-	Lt Col SMITH
605 TD Bn	-	Lt Col BUCKWALD	772 TD Bn	-	Lt Col McCLELLAN
607 TD Bn	-	Lt Col SUNDT	773 TD Bn	-	Lt Col SPIESS
609 TD Bn	-	Major SHOTOLA	774 TD Bn	-	Lt Col STURGES
610 TD Bn	-	Major KINTOLA	776 TD Bn	-	Lt Col MOOREHEAD
612 TD Bn	-	Lt Col DEELEY	801 TD Bn	-	Lt Col HORSFALL
614 TD Bn	-	Lt Col PRITCHARD	802 TD Bn	-	Lt Col MONTGOMERY
628 TD Bn	-	Major GALLAGER	803 TD Bn	-	Lt Col GOODWIN
629 TD Bn	-	Lt Col COLE	807 TD Bn	-	Lt Col SMITH
630 TD Bn	-	Major JONES	808 TD Bn	-	Lt Col McDONALD
631 TD Bn	-	Lt Col NATHAN	809 TD Bn	-	Lt Col LAWSON
634 TD Bn	-	Lt Col DAVISSON	811 TD Bn	-	Lt Col BROWNFIELD
635 TD Bn	-	Lt Col SMITH	813 TD Bn	-	Major McCUTCHEON
636 TD Bn	-	Lt Col WILBUR	814 TD Bn	*	Lt Col JONES
638 TD Bn	-	Lt Col DAVIS	817 TD Bn	-	Lt Col BARDES
643 TD Bn	-	Lt Col FARR	818 TD Bn	-	Lt Col HAIL
644 TD Bn	-	Lt Col GRAHAM	820 TD Bn	-	Lt Col PATRICK
645 TD Bn	-	Lt Col AUSTIN	821 TD Bn	-	Lt Col AHBURY
648 TD Bn	-	Lt Col MAYO	822 TD Bn	-	Lt Col MAINS
654 TD Bn	-	Lt Col HINTON	823 TD Bn	-	Lt Col DETTMER
656 TD Bn	-	Lt Col MEADOR	824 TD Bn	-	Lt Col SMITH
661 TD Bn	-	Unknown	825 TD Bn	-	Lt Col HEADING
679 TD Bn	-	Unknown	827 TD Bn	-	Lt Col VANDERSWEEP
691 TD Bn	-	Major FINLEY	893 TD Bn	-	Major CARLIN
692 TD Bn	-	Lt Col HORSE	899 TD Bn	-	Lt Col TINCHER
702 TD Bn	-	Lt Col BELL	RBFM * TD Bn	-	Lt Col MAGGLER
703 TD Bn	-	Unknown			

* Regiment Blindee Fusiliers Marines.

Logan C. Berry

LOGAN C. BERRY
Colonel, Cavalry (TD)
Commanding.

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FOR INFORMATION ON ARDENNES BREAKTHRU SEE ATTACHED SHEET

NOTE: Please send your contributions in early for March issue.

APPENDIX NUMBER 1 TO TANK DESTROYER INFORMATION LETTER NUMBER 4.

EXPERIENCES OF 630TH TANK DESTROYER BATTALION IN ARDENNES BREAKTHROUGH

The 630th Tank Destroyer Battalion (towed) was attached to the 28 Infantry Division and was along the OUR RIVER (GERMANY - LUXEMBOURG border) at the start of the German breakthrough on 16th December 1944. As a result this organization caught much of the German blow and had an excellent opportunity to see German tanks in action. The following points are considered worthy of note:

1. The terrain of the initial breakthrough in our sector was very hilly and tanks were confined to the roads. It was not tank country; there were few tank approaches; yet the Germans used tanks in large quantity (and successfully) to support their attack.

2. This use of tanks was possible mainly because of the excellent tank-infantry coordination. In several instances three or four tanks and approximately 100 infantry worked together. They worked as follows:

The tanks would advance as long as there were no obstructions. When one of our AT or TD guns was located, the tanks would hold back and the infantry would deploy and advance upon our position. (It must here be pointed out that the division was spread over a 30-mile front and, consequently, there was little infantry with our guns. On some occasions there was no infantry near the guns, which had to depend solely on their security sections for protection.) The German infantry was aggressive and the majority of the guns were lost to enemy foot troops. This would not have happened if we had (1) sufficient friendly infantry to defend our positions or (2) if we had been self-propelled and could have manoeuvered our guns.

3. If possible, towed guns should be dug in for 360° traverse. In certain cases, enemy tanks manoeuvered so as to approach on a blind spot, and, if the gun was not dug-in so it could be man-handled to cover that area the chances are the gun would be lost. This is true even though the guns in a section or platoon are mutually supporting, for one or more guns may be knocked out and the remaining gun or guns will have to cover a much larger sector. The 360° traverse should be sought at all times, though the ranges to some sectors may often be very short.

4. Tank destroyer gun crews should be furnished with flares for illumination of targets at night. The Germans made extensive use of flares and at night these were used whenever our troops were encountered. Not only do flares aid by illuminating the target, but they aid greatly by the effect they produce on the opposing troops. This is most demoralizing. It is particularly recommended that outposts be furnished these flares for the following reasons: (1) Alert (as a signal) the gun crews; (2) demoralize the enemy and (3) illuminate the target. The M17A1 grenade, illuminating, shot from rifle or carbine launcher has proved successful for this purpose.

5. Towed tank destroyer guns must have friendly infantry to protect them from foot troops. The following incident will illustrate this statement.

Two towed guns of the first platoon, Company "B", were in position on a road which was a likely tank approach. Three enemy tanks with infantry riding on them approached the position. The tanks were about 200 yards apart. The gunner of our forward gun permitted the lead tank to approach to a range of 350 yards before firing, hoping the second tank would follow the first out of some woods. On opening fire the gunner fired 7 rounds at the tank and completely knocked it out and killed most of the infantry riding on it. The second tank remained in the woods. The infantry dismounted and advanced on our gun. The third tank took a covered route and moved to position to fire on the second gun. By this time the first gun had to be abandoned (due to number of enemy infantry) and the second attempted to swing toward its rear to shoot the third tank. Before this could be completed the tank opened fire on the position. The fourth round destroyed the half-track. Enemy infantry advanced on the position and the gun was put out of operation by our crew which then had to withdraw on foot.

6. Every vehicle and gun should have an incendiary grenade taped to a conspicious and vulnerable spot, and all personnel should be instructed in their use. This instruction should include means of destroying or damaging equipment without the incendiary grenade or by fire, as the time may arrive when use of these will give your position away and thus cannot be used. We do not expect to have to destroy any equipment - but it was necessary once. Equipment should not fall into enemy hands unless it has first been damaged as much as possible.

7. It is the firm conviction of this organization that if it had been self-propelled, rather than towed, the outcome would have been much more favorable. Our officers believe we would have knocked out approximately twice as many tanks as we did, and would not have lost as much. Some of our guns had no opportunity to fire on enemy tanks - their infantry overran our positions before the tanks came within range of the guns. Also, due to the nature of the terrain our guns often could not move to the most favorable positions at opportune moments, thereby failing to knock out tanks which a self-propelled gun could have fired upon. The towed 3" gun is an excellent weapon, but in withdrawal movements it cannot fire on tanks; and then displace with the same ease as a self-propelled gun. Rather, if it becomes seriously engaged in close fighting the chances are the gun may have to be abandoned.

8. Our troops should be provided better winter equipment, both organizational and personal. In snow-covered terrain, guns, vehicles and personnel stand out like the proverbial "sore thumb". We procured all the sheets possible and found these to be excellent camouflage for the gun, particularly as they may be removed if the gun is placed against a dark background, in woods, etc. The main difficulty, however, is the supply of sheets. Personnel should all be issued combat clothes for winter and white uniform covers or capes for use in the snow. The Germans have excellent personal camouflage equipment for snow-covered terrain, and its use makes them very hard to observe. (S-3, 630th Tank Destroyer Battalion).