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THE CAVALRY JOURNAL

"The strife is o'er,
The battle done;"

JANUARY-FEBRUARY, 1946

The Cavalry Journal Plans to Reissue Chamberlin's Books on Horsemanship

THE CAVALRY JOURNAL is negotiating for the publication rights of the two classical books on horsemanship by the late General Harry D. Chamberlin, which have been out of print for some time: *Riding and Schooling Horses*, and *Training Hunters, Jumpers, and Hacks*.

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Organized November 9, 1885

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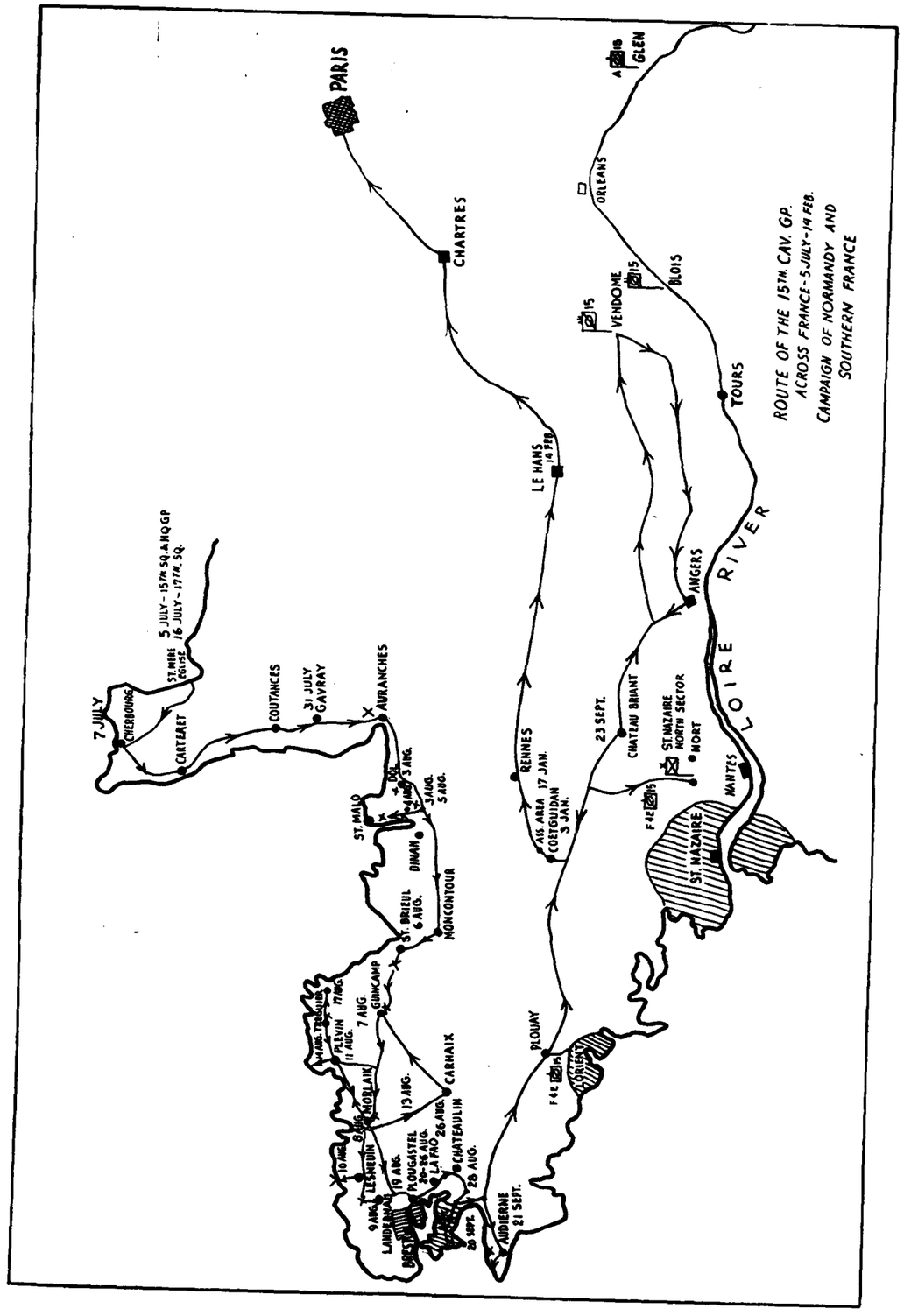


15th CAVALRY GROUP

CONCLUSION

Assault Guns in Defensive Action

by Captain Edwin E. Lasson

FROM October, 1944, to February, 1945, the 17th Cavalry Reconnaissance Squadron was engaged in an entirely defensive rôle with the Ninth Army. From the beginning, Troop E (assault guns) directly supported the squadron with indirect fire, except on a few occasions when German positions were too close for such fire.

During the last week in October, the 17th Squadron was attached to the 113th Cavalry Group, then on the left of the Ninth Army. Troop E of the 17th Squadron relieved Troop E of the 125th and took over its positions. Both the Germans and our own troops were engaged in intensive patrolling, and defensive firing had to be closely coördinated with the troops.

The targets fired upon were numerous, and included enemy engaged in digging new positions, German patrols, harassing missions, and static defensive positions. The guns had been registered on likely avenues of approach, and the data recorded so that fire could be quickly laid. Guns were fired daily on check points to determine any change required in the firing data because of weather changes or gun movements.

When the squadron relieved elements of the 120th Regiment, Troop E was attached to the FA battalion of the 30th Division, and went into position at Frenhoven, some 3,000 yards from the front lines, where it handled all fire missions for the 17th Squadron. This attachment increased the battalion's fire power from 12 to 16 guns, and the battalion's data on troop positions enabled the combination to produce more effective fire.

There was such a severe shortage of artillery ammunition, especially 105mm and 155mm, that the battalions were limited to approximately three rounds per gun per day. Ammunition for 75mms was never limited, however, and the FA battalion employed assault guns to great advantage. They were used for all types of missions, from TOT to harassing fire. Near the end of Troop E's tour of duty with the battalion, it was firing on such choice targets as troop concentrations, gun positions, vehicles, etc. Because of the combined weight of the tank and gun there was little dispersion during heavy firing, and the FA battalion was enthusiastic about the firing speed and accuracy of the weapons.

When the 30th Division moved south to meet the onrushing Germans in the Ardennes forest, the squadron was attached to the 29th Division. The assault guns, again working under the control of a FA battalion, were set up east of Pattern within 1,500 yards of the front lines. The position was in a ravine which could be reached by a concealed route. Thirty feet in front of the guns a bank concealed the muzzle blast at night, thus providing concealment from any German OP, and cover from all except high trajectory weapon fire.

The guns remained in this position until December 24. Because of the unlimited amount of 75mm ammunition, the assault guns were used to cover the entire division front. As many as 500 rounds were fired each night, and 200 during the day. The troop again was complimented for its fire discipline, speed, and the accuracy of its fire, which were made possible by the 360-degree traverse of the turret.

On December 24, the squadron was attached to the extreme left flank of the Ninth Army, and moved into the small town of Suggerath, approximately 4,000 yards north of Gelsenkirchen, Germany. The 6 guns went into position in the village, which was in a valley that provided concealment, and was difficult for the enemy to fire upon. Again the troop was attached to a FA battalion, which was a part of the 102d Division.

It remained here for three weeks, and fired on many point targets—German patrols, vehicles, troops, concentrations, and harassing missions. Squeezed out of this sector in mid-January by the British advance to the Ruhr, it was attached to the 11th Cavalry Group, and moved into position at Linnich, Germany, to relieve the 44th Cavalry Reconnaissance Squadron.

The assault guns went into position about 4,000 yards behind the lines in rear of the village of Ederen, Germany; the same system of coördination with a FA battalion was employed, and the previous experiences duplicated. At times the troop also was assigned the mission of firing on Jerry antiaircraft batteries, and destroyed a number of them and their crews as they fired at Allied planes which were bombing and strafing targets directly in front of the troop's positions.

British-American Contact

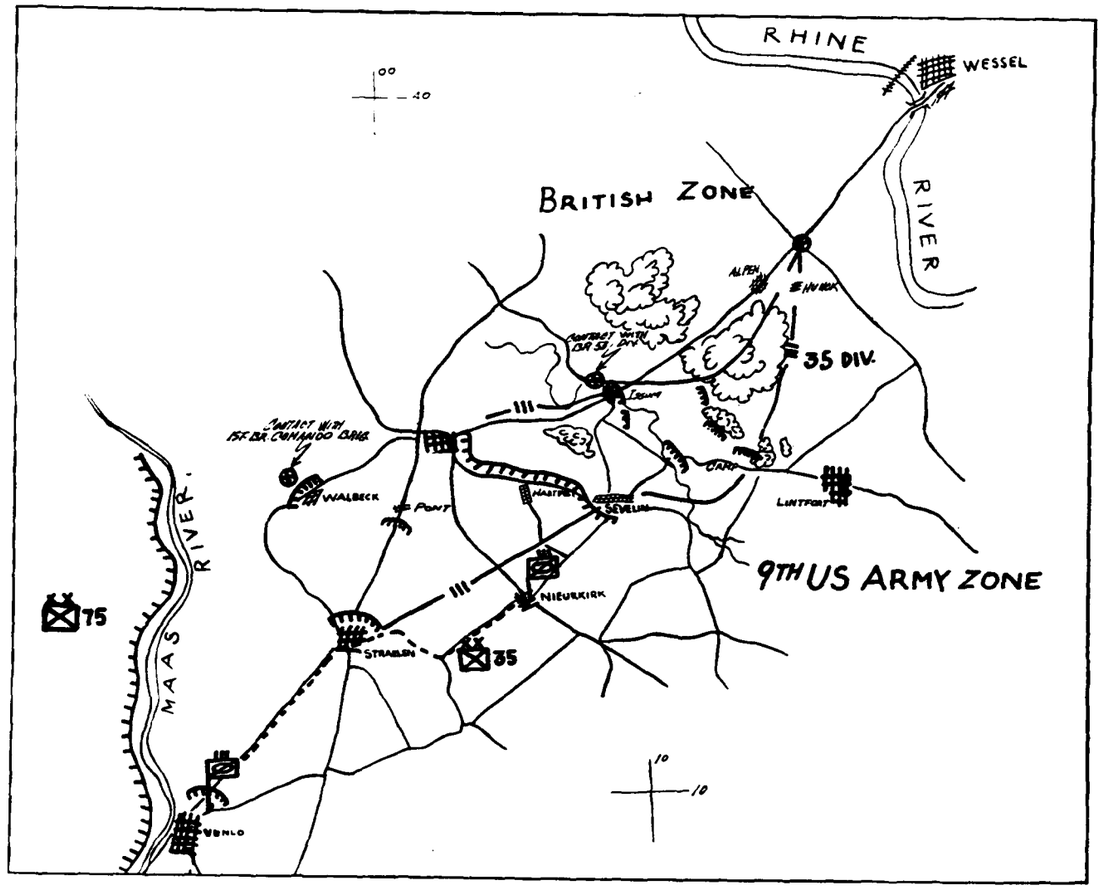
ON March 1, 1945, the 15th Cavalry Group received orders which relieved it from a defensive position on the west bank of the Roer River near Roermond, Holland, and directed it to proceed south to Heinsberg, Germany, then cross the Roer River. The 35th Infantry Division had already crossed the Roer on its way to the Rhine, and the group's mission was to screen the division's left flank, and to link up with the First Canadian Army, which was pushing south from Nijmegan, Holland, between the Roer and Rhine Rivers.

Group Moves Out

The 15th Cavalry Group, led by the 17th Cavalry Reconnaissance Squadron, moved out from Wassenberg, Germany, and headed toward Roermond. The troops entered the city from the east that evening without meeting opposition from the enemy. Since this was a strong part of the Siegfried Line, however, there were many enemy mines on the road, and squadron headquarters and Company F each lost some vehicles.

The 17th Squadron spent the first night just east of Roermond. Patrols were sent out to search for intact bridges across a canal and small stream between Roermond and Venlo, but it was found that in their evacuation from Roermond the Germans had blown down large numbers of trees across the roads and destroyed all bridges between the two cities. The squadron turned east 15 miles where a team of Troop C's 2d Platoon found bridges across the two streams, which were wired with dynamite and small bombs. These were neutralized and the group headed north to Venlo by an extremely devious route through the firebreaks of the forest. It entered Venlo on the evening of March 2 without meeting enemy opposition.

The next morning, still screening the 35th Division's left flank and endeavoring to link up with the Canadians, the group headed northeast toward Geldern, Germany. At Pont, Troop B, leading the 17th Squadron, met heavy opposition. Troop C was ordered to



by-pass to the enemy's right flank, but found the bridges destroyed and returned to help Troop B take Pont.

The 2d Platoon of Troop C, 17th Squadron, in the meantime had entered Walbeck where it established road blocks, and against little resistance captured 11 enemy soldiers and large stores of weapons and ammunition.

The platoon occupied the town, and manned its road blocks during the night of March 3-4.

Armies Link Up

At 0300 on March 4 a large patrol of one officer and 60 men from the First British Commando Brigade walked into the platoon's area. After mutual challenging the patrol leader came forward to identify himself and his men, who had walked from Weil, Holland, a distance of 30 miles, to effect the link-up between the U. S. Ninth Army and the First Canadian Army. After an exchange of notes of military value, the Canadians moved back toward their starting point.

The next day the platoon was relieved by a platoon from Troop B, and rejoined its troop at Straelen, Germany, and later participated in guarding the forward echelon of the U.S. XVI Corps until the corps' headquarters moved across the Rhine River.

After the 15th Cavalry Group crossed the Roer at Heinzburg, the 17th Squadron took the lead in performing the group's mission to screen the left flank of the Ninth Army and establish and maintain contact with the British Second Army.

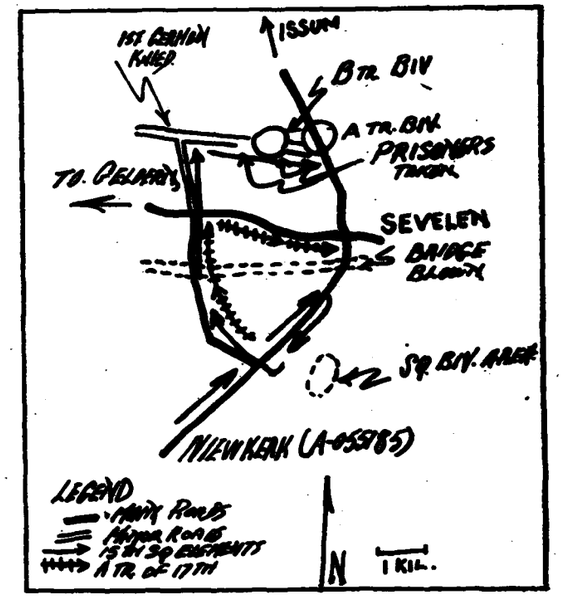
The 15th followed the 17th until it had reached Stadt Straelen, where the 15th was ordered to proceed to Issum. Troop A of the 15th was leading. The route selected was east through Nieukerk toward Sevelen. At 1300, March 2, Troop A was held up half a kilometer south of Sevelen by a blown bridge across a cut. The town had been occupied by elements of the 35th Infantry Division the night before, but the Germans had slipped in and blown the bridge. Tanks of the 35th were along the cut shelling the Germans beyond the town. In midafternoon Troop A of the 17th, advancing from Hartefeld toward Sevelen, met heavy resistance but was able to get a small unit on into Sevelen to contact our infantry.

About 1600 squadron headquarters decided to by-pass Sevelen by crossing a bridge just south of Hartefeld. Troop A was sent out ahead, and at Hartefeld took a minor road into the woods along which the first German was seen crossing a clearing on a bicycle. He was killed.

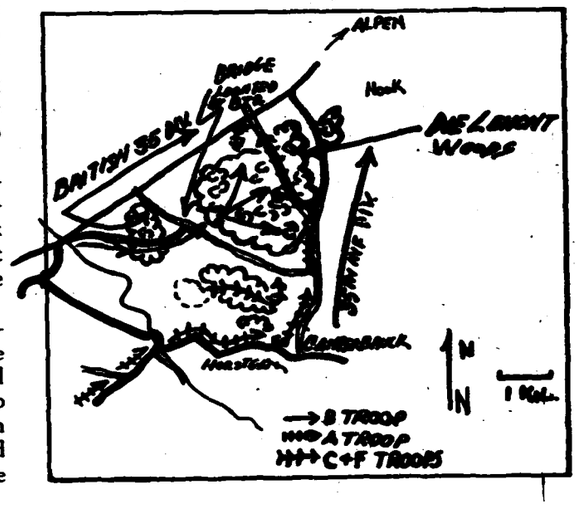
The troop then went east toward the main Sevelen-Issum road 4 kilometers away. It was getting quite dark so the column was closed up. Twice along the road small German parties ran into it before they knew who we were. The first group, armed with a machine gun and panzerfausts, was fired upon by the rear guard and one prisoner taken. The advance guard reached the Sevelen-Issum road about 2400 and bivouacked and informed squadron headquarters near Hoog of the location. Troop B, with a platoon of the 187th Engineers attached, moved into bivouac to reinforce A at 0130. During the blackout drive one bulldozer was overturned.

On the morning of March 3, Troop A moved east and south toward Sevelen in an attempt to contact the 35th Division. Troop B proceeded to Issum in an effort to contact the British. The 2d Platoon went northwest along two minor roads to cut the main Geldern-

First day of action, 15th Squadron.



Third, 4th and 5th days of action.



Issum road. En route it picked up German stragglers. Near the main road the platoon received small-arms fire, and took positions straddling the road.

British Are Contacted

Heavy-tracked vehicles were heard approaching the position about 1100. German snipers in the woods fired in the direction of the sound. This drew tank fire on the 2d Platoon from the approaching British 53d Division. No casualties were caused. The 2d Platoon recognized the friendly troops and were able to identify themselves. This contact, at 1240, was the first that the 15th Squadron had made with the British.

The rest of Troop B had moved north on the Sevelen-Issum highway. The main body plus one platoon of assault guns halted and established positions about one kilometer south of Issum. The 3d Platoon was sent ahead to take Issum. It met small-arms fire and took positions near the bridge across the Nenneper River. At this point two Germans on bicycles came out of an alley and blew up the bridge. The blast killed one of the Germans and knocked Sergeant Smith of the 3d Platoon down. A German self-propelled gun withdrew 500 yards from its position across the river and started shelling the town. Assault gunfire was called for by radio. The assault guns had already been laid on the bridge by map, so it was possible to adjust fire on the self-propelled gun. It withdrew on the fourth round.

The troop consolidated its position and bivouacked in Issum. The next morning Troop A's 1st Platoon was sent south into Sevelen. Its mission was to contact the 35th Division and form liaison with its left elements. The remainder of the troop moved east on a secondary road.

Friendly TDs in position on the outskirts of Sevelen observed the troop approaching a crossroad about one and one-half kilometers east of their bivouac area. Not expecting friendly troops in front of them the TDs opened fire, knocked out one jeep and hit an armored car and another jeep with shrapnel. After the 10th round, Troop A realized that the fire was from a friendly source, and was able to attract the attention of the TDs by the use of yellow smoke and a waving panel. Troop A bivouacked in the vicinity for the night.

About 1000 that same day, Troop C had advanced past Troop A to reconnoiter for crossings over the Nenneper and Fleuvth Rivers. It crossed the Nenneper just west of Horstgen and most of its personnel continued into town and contacted the 35th Division. One platoon was sent north on a small road and encountered heavy fire at the edge of the woods just north of the Fleuvth. Toward evening it withdrew across the Fleuvth, and was joined by the rest of the troop, which bivouacked along the river.

Enemy Is Enveloped

By the next morning, the third day of action for the squadron, the British had built two bridges at Issum. The squadron was to proceed northeast on the main road toward Alpen and Wesel. Troop B crossed the bridge at 0600 and reconnoitered roads to the southeast of the main road. The British were held up by a blown bridge and heavy resistance two kilometers east of Issum. Troop B already had reconnoitered a woods southeast of that point and found a bridge intact. When the information was reported to British Headquarters in Issum, where the 15th Cavalry Squadron Headquarters Forward was also located, the British moved out and effected a right envelopment of the Germans holding them up on the main road. Troop B consolidated its position along the southwest edge of the Die Leucht woods and remained overnight.

That same morning Troop A moved to Horstgen, less its 3d Platoon, which was sent to Camperbruck to reconnoiter for positions which would screen the 35th Division's left flank. Camperbruck was cleared in the afternoon by the 35th Division's tank-infantry team, which then moved into night bivouac on the north edge of the woods. The 3d Platoon of Troop A took a position for the night on the team's left, in a group of buildings that were in an uncleared section of the woods. During the day, Troop C had consolidated its position between B and the 3d Platoon of A.

The next morning Company F and Troop C were given the mission of flushing a small woods just south of the Die Leucht woods. They worked east and contacted the 3d Platoon of Troop A at the south end, without meeting enemy resistance. They also found part of Troop B on the road at the north edge of the wood. Keeping contact with the British on their left, Troop B worked east through the Die Leucht woods. At all times the squadron maintained contact with the British flank brigadier's headquarters through the use of liaison officers and radios.

The 35th Division fought its way north along the east edge of the Die Leucht woods, and the British advanced along the north edge toward Alpon. Both were meeting heavy resistance from stiff delaying actions which were supported by considerable self-propelled gunfire.

The area was becoming quite narrow between the Ninth Army and the First Canadian Army, so the 14th Squadron was relieved of its liaison and screening mission on the left flank of the Ninth. At noon on March 5 Troops B and C assembled at Horstgen, and squadron headquarters and F at Camperbruck. Troop A was attached to the 35th Division to continue the liaison mission with the British.

Finale

Between March 6 and 9, Troop A maintained contact between the British and the left flank of the 35th Division. Progress was slow for the British because they were held up at Alpen. The Germans fought a stiff

delaying action all along the east edge of the Die Leucht woods. Troop A's liaison was particularly useful when the forward elements of the 35th Division were drawing close to the British near Huck and Drupt. During this time radios were kept at both flank battalion level CPs.

On March 9 the Germans were pushed back across the Rhine, but not before they had blown both bridges at Wesel.

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A Night Patrol in the Siegfried

by Captain Norman F. Ralston

A NIGHT MISSION to reconnoiter Roermand and its heavily mined approaches for hostile forces had been assigned a task force composed of the 2d Platoon, Troop C; the 2d Platoon, Company F, 15th Cavalry Reconnaissance Squadron; and the 1st Platoon, Company B, 187th Engineers.

Each Unit Assigned Task

Each unit was given a specific task. The 2d Platoon, Troop C, was to reconnoiter the route and provide local security, and the 1st Platoon, Company B, was to clear the road of mines, road blocks, and obstacles. The 2d Platoon, Company F, composed of light tanks, initially was to strengthen the line of departure, and once the mission was under way it was to follow as a reserve and prevent hostile forces from cutting off the patrol from the rear. Also attached was a demolition squad which carried equipment to blow mines or to blast out road blocks.

In supporting positions were one battery of the 691st Field Artillery, one platoon of 4.2-inch mortars, a platoon of assault guns, and a platoon of tank destroyers. All had planned fire concentrations on likely targets. The artillery was directed by a forward observer who accompanied the patrol, the mortars were under squadron control, and the TDs and assault guns under command of Troop C's executive officer. The assault guns were to cover the formation of the patrol with harassing fire, and the TDs were in position to fire on long-range targets or to contest any opposing armor.

It was known that the area had been haphazardly mined with antitank and antipersonnel mines, and that some of the buildings had been booby-trapped. Consequently patrol members were ordered not to go into any building unless opposition came from it. If hostile activity drove the patrol from the road, the leading elements were to clear the ditch and go to the left of the road under the command of the reconnaissance platoon leader. The main body was to do likewise to the right and rear under command of the platoon sergeant. The engineer party was to withdraw to the rear.

Patrol's Order of March

The patrol formed at dusk northeast of Linne and moved out at 2230. The enemy had become strangely quiet. Except for a little harassing mortar fire in the afternoon, he had apparently closed shop. Three scouts preceded the leading patrol elements by 200 yards, one armed with a rifle, two with submachine guns, and each carried a small limber stick which was pushed along in front of him to detect any trip wires across the road.

Following the scouts in staggered formation were three three-man teams of mine sweepers, each composed of an operator, a prober, and a rifleman from the point. Immediately behind the mine sweepers came the remainder of the point, armed with a light machine gun and bazooka. The point was followed closely by a party of 12 markers and mine pullers.

The patrol's main body followed the markers and mine pullers by 200 yards to allow time to mark or pull any scattered mines. The main body was composed of two sections from the reconnaissance platoon and the remainder of the engineer platoon. The engineer party was to clear any obstacles which had been by-passed.

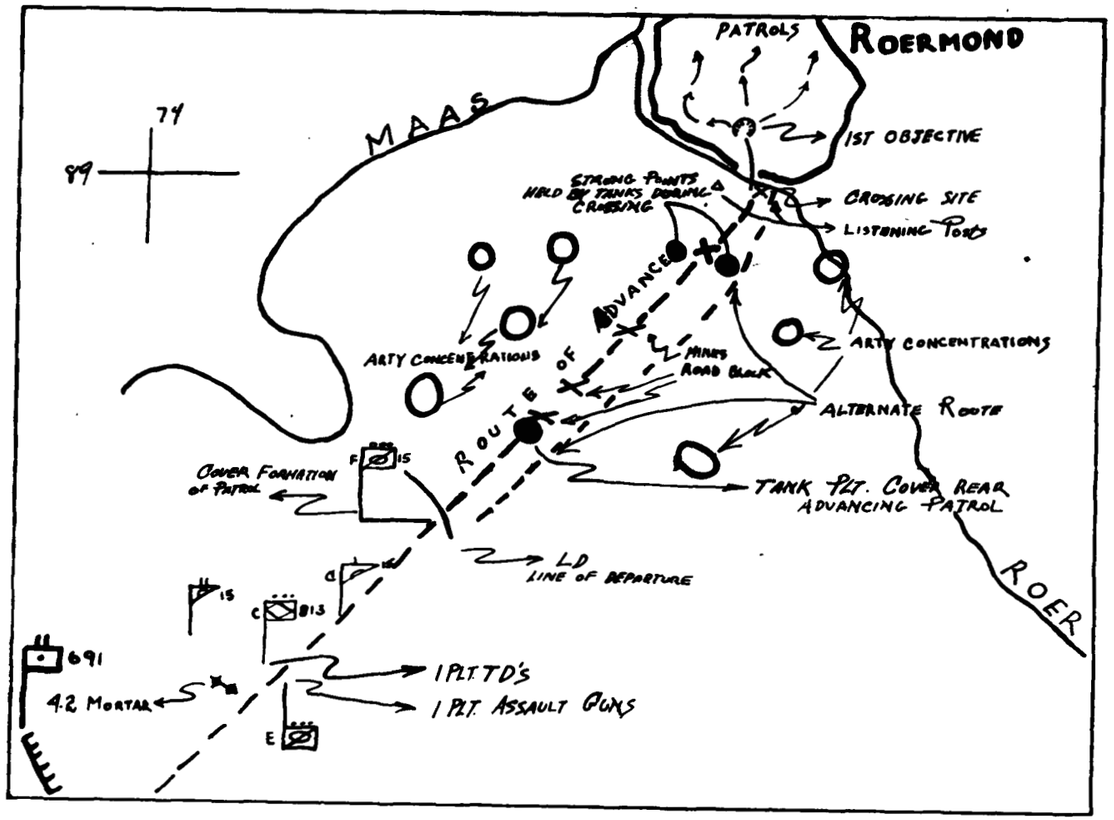
The rear guard followed at 100 yards and was composed of one ¼-ton carrying radio, communication party, and a light machine gun, and a ¼-ton carrying the demolition party with its equipment and a light machine gun. Since support fire was to come from artillery and assault guns, the mortar squad (60mm) formed the rear element.

Mines and dismounted enemy had been cleared from the line of departure the previous afternoon.

As the patrol moved forward the assault guns laid harassing fire in the vicinity of Merum to the left of the route of advance. No obstacles were encountered until the patrol had traveled about 1,000 yards. Here the way was blocked by a well-laid field of Regal mines and debris that had been booby-trapped. The debris was cleared away and a zigzag trail was discovered through the field. No enemy was encountered.

The tank platoon was brought up to this point to cover the north and south roads. The harassing fire ceased and the patrol advanced, leaving a party to clear the road of mines. A small number of mines were found at the crossroads but the patrol's progress was slowed only a few minutes.

The patrol came upon a road block of iron rails, wire,



and a heavily mined area. Scouts were sent out and the area was found undefended, whereupon the engineers and demolition party reduced the obstruction. Numerous and scattered mines and removable road blocks were encountered up to the riverbank.

A small patrol had worked its way through the field, and at 1235 reached the river bank where it set up listening and observation posts. Scouts reconnoitered the river, over which all bridges entering the town had been completely demolished, for a crossing site. At 0215, the main body arrived at the river.

The buildings and high ground were reconnoitered, and strong points of one section each were set up at two points. Another section remained in observation along the river. Only occasional lights were observed on the east side of the town.

After the roads had been cleared, assault boats were brought up. Because of the swift current a crossing site between the highway and the railroad bridge was chosen.

Tanks were moved up to cover the high ground on the south riverbank.

River Is Crossed

Crawling across the river on the debris from the bridge, the first section crossed before dawn. It was to investigate the defenses immediately across the bridge, then continue to a point at which it was to establish holding positions until joined by the remainder of the platoon. The first section reached its objective, and the remaining two sections crossed immediately to join it. Patrols then were sent to north and east sides of the town in which extensive road blocks, mines, booby traps, and damages from the demolitions were found, but no enemy. Civilians reported that enemy troops had cleared out at dusk, en route east.

The patrol withdrew from the town at 1200. The corps commander now knew that the enemy was fleeing from the Siegfried Line.

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The Relief of An Armored Division

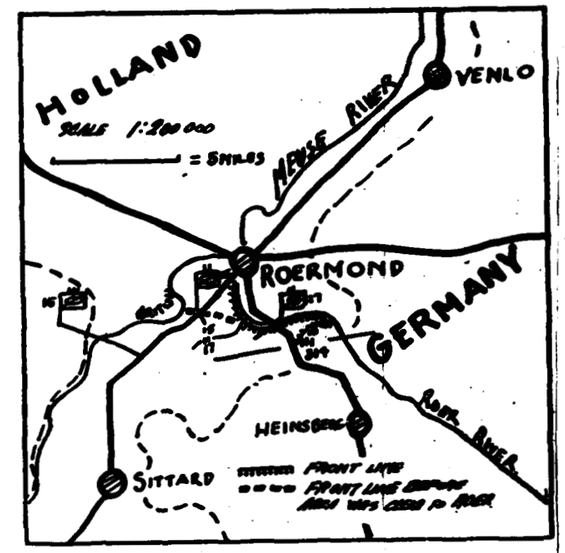
by Major Herman M. Marlow

AT 1000, February 27, 1945, the 15th Cavalry Group and its attached squadrons reverted to the direct control of the XVI Corps and was ordered to relieve the 8th Armored Division and establish a defensive line on the west bank of the Roer River.

The relief of the division, which occupied a sector from Vlodrop to Roermond, took place during the night of February 27-28. It was completed by 0010, and by 1200, February 27, the group CP had been established at Echt.

In the group sector the 15th Squadron relieved CCR on the left, and the 17th Squadron relieved CCB on the right. The front line extended from Vlodrop, on the south, to the Meuse River, on the north.

The width of the group's sector, and the size of the unit it relieved, as compared with a cavalry group, made it necessary for each squadron commander to reorganize his assigned sector so that units could be employed effectively.



Disposition of Troops

The reconnaissance troops were employed on the line to establish defensive positions, and the tank companies were held in squadron reserve. In each squadron's sector, the assault gun troops furnished direct supporting fires through the F.D.C. of the supporting artillery, an element of the 8th Armored Division. No other forces were at the disposal of the group.

The front line in the 15th Squadron's sector had not been cleared of enemy to the Roer River, but it was believed that the enemy would soon withdraw across the Roer in order not to be cut off by a task force of the 35th Division, which was spearheading northward to Venlo, east of the Roer.

The enemy was employing a passive defense and using little harassing artillery, consequently the group's thinly held line was sufficient to serve as a screen which could report any attempted enemy reconnaissance and/or offensive action. In positions not actually occupied by troops because of the width of the sector and the terrain, trip flares and patrols were used to cover the front.

The group remained in this sector until relieved to participate in the Ninth Army's operation "Grenade."

Conclusions

A cavalry group which is employed in a defensive rôle, such as has been described, must depend entirely upon the tank companies for its counterattack force because all platoons of the reconnaissance troops are distributed along the front, and there are no reserves to shift. This is a good argument for a three-squadron group. A great deal of unavoidable congestion and noise occurred with this size unit when the relief was effected, and could have resulted in aggressive action, had the enemy been on the alert and offense-minded.

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Cavalry Holds A River Line

by Major W. E. Hudson

DURING the final days of March, 1945, elements of the XIX Corps of the Ninth Army crossed the Rhine River and rapidly thrust eastward toward the Elbe River. A deep penetration was thus effected into enemy territory. On the southern flank of this penetration was the enveloped Ruhr pocket; on the northern flank were scattered elements of enemy troops.

Mission

On March 31, the 15th Cavalry Reconnaissance

Squadron was given the mission to seize and hold all crossing over the Lippe River in its assigned zone, and to reconnoiter south of the Lippe River and Canal if the crossings were found to be intact. A secondary mission was to establish a counterreconnaissance screen along the north bank of the Lippe River and prevent enemy infiltration into the squadron zone.

Some 300,000 enemy troops were reported encircled in the Ruhr district immediately south of the Lippe River and Canal. There were portions of many enemy divisions contained in the area, including elements of the 116th Panzer Division, and the enemy was considered capable of pushing north and severing the supply lines of the XIX Corps. The Third and Ninth Armies were progressively tightening their ring of troops around the Ruhr pocket. During these operations the enemy was counterattacking, indicating that he was still organized and that breakouts were desired.

The squadron moved from its bivouac area near Wulfen at 1445 on March 31, and at 1630 entered its assembly area immediately east of Haltern with two troops abreast. Troop B was on the right and Troop C on the left. Troop A, Troop E, and Company F initially were in squadron reserve, moving with the squadron CP through the center of the squadron zone. One platoon of Troop A and one section of Company F were on detached service to higher headquarters and did not participate.

At 1727 the first afternoon, Troop B had reached the Lippe River without encountering enemy resistance, and had established a counterreconnaissance screen in the vicinity of Hasbring, Wiesmann, and Heumann. All bridges within the zone were blown by the enemy to prevent a further advance.

Enemy Contact

In its advance, Troop C made contact with the enemy at 1830, when it met stiff resistance from a wooded area immediately south of Ubbenhagen. One platoon had inadvertently traveled out of its zone and entered the town of Werne on the Lippe River immediately to the left of the squadron zone. As the platoon approached the bridge spanning the river it was blown by the enemy and a sharp fire fight ensued. Later that evening, discovering that it was out of its assigned zone, the platoon gave its information to elements of the 17th Cavalry Reconnaissance Squadron and withdrew into the proper area.

At 2015 the remaining platoons of Troop C, which were pushing deeper into the woods just south of Ubbenhagen, encountered intense enemy fire from panzerfaust and small arms. Inasmuch as darkness was closing in, Troop C was withdrawn to a position just north of the woods. One platoon of Troop A and one from Troop E then were placed under Troop C's control and were utilized to reinforce its positions for the night.

Immediately after the squadron's arrival in its assigned zone, while it was still daylight, Troop A reconnoitered to the flanks and rear and made contact with friendly troops without encountering any enemy.

Mop Up

The following morning at first light Troop C, supported by Troop A, Company F and Troop E, continued the advance on the Lippe River. The enemy that had given opposition the previous night had withdrawn to the river line, which was reached without serious fighting. Small-arms and scattered artillery fire then were received from the south bank of the river, and a counterreconnaissance screen was established in the troop's zone. The remainder of the second day was spent mopping up stragglers, safeguarding enemy equipment and installations and in improving defensive positions.

Troop E took up battery position for indirect fire missions to the left center of the squadron zone, and registered-in its guns preparatory to firing missions south of the Lippe-Canal or laying defensive fires should the enemy attack. Contact to the flanks was established, and late in the afternoon a change in dispositions was made on order from higher headquarters which increased the total squadron front.

The third day was occupied in firming-up all positions, replacing radio communications with telephone, laying defensive action plans, and in general increasing the safety of the entire squadron position.

During the first three days operation, 137 POWs were taken, but only 12 dead were counted. Questioning of prisoners revealed that enemy troops were withdrawing to the Dortmund area.

Operation Concluded

During the remainder of the operation, until April 12, when friendly troops cut across the squadron front south of the Lippe Canal, the operation consisted largely of routine observation, indirect fire missions and blocking of tank approaches. During the latter period an additional 92 POWs were taken, and continued small-arms and artillery fire, including air bursts, were received from enemy positions.

An interesting sidelight on this operation was the delay caused by a small dismounted enemy party at night. Troop C had been held up the first night by dismounted enemy troops armed with panzerfausts and light machine guns. The following morning, with tanks and assault guns, the troop had advanced practically unopposed. The combination of darkness, dense woods and familiarity of terrain had enabled the enemy to hold up the advance of Troop C. In daylight, however, the enemy's position became untenable and he withdrew.

(The End)

Communications in Combat

*by Captain Carl E. Seitz**

THE communications system of the 15th Cavalry Squadron was severely tested in the squadron's great variety of missions as it moved across Europe. Its route was from the beaches of Normandy and the hedgerows of Brittany to the hills and plains of northern France, and then into the mountains of central Europe.

In the hedgerow country of Normandy and Brittany the -506 radio was used as the principal means of communication between troops and squadron headquarters. The size of the squadron zone necessitated the dispersion of its units to such an extent that, over the uneven terrain, the -508 radios would not cover the distance. The -508 served within the unit itself, however, and its simplicity of operation enabled it to be operated by other than trained personnel. This alleviated the terrific strain on the regular, assigned radio operators.

During this campaign, some units of the squadron were assigned dismounted patrol missions, and were handicapped in their communications. SCR-510 radios were dismounted for use on the patrols, but proved quite unsatisfactory because of their bulk. Defects developed from exposure to wet weather, and it became necessary to secure infantry SCR-536 sets. These proved satisfactory, although lack of time and equipment prevented the coördination of the frequencies used.

Relieved of its assignment on the Brittany peninsula, the squadron moved east across northern France and established its CP near Blois. It took over the job of patrolling the Loire River from Auxerre in the east to Nantes in the west, an air-line distance of approximately 240 miles. During this mission, the -506 really proved itself by maintaining contact between the squadron and the CPs of units on patrol, which were located 80 and 90 miles away. A "flat top" antenna was erected, and this seemed to "reach out and get them." A relay station was necessary to reach the units patrolling the most western portion of the river.

When the squadron was assigned the mission of containing the enemy forces in the St. Nazaire pocket, the use of the telephone as a supplementary means of communication was initiated, and soon became the primary means of communication between the immediate units in that area and their platoon outposts. The telephone proved not only convenient and secure, but highly valuable at night when enemy "jamming" made radio communication extremely difficult. Since at this time the squadron TO/E did not provide for wire communication equipment or personnel, it was necessary to borrow telephones, wire, wire-laying equipment and switchboards.

The squadron moved across France, through Belgium, and into Holland to join in the "Push" to the Rhine. From the Roer to the Rhine, on missions such as dismounted reconnaissance patrols, phone communication proved invaluable as the sole means of communication. We were unable to obtain more than a limited amount of wire from supply sources, and all such communication was maintained with improvised and captured German equipment. The improvised material proved highly impractical, but after numerous attempts and considerable waiting we finally acquired an RL-31. Thereafter our wire-laying problems were solved.

During the waiting period, prior to the crossing of the Rhine, the telephone also served to facilitate the making of plans and the maintenance of their secrecy. It is not intended to imply that in general during the latter campaign, the primary medium of communication was by telephone. On the contrary, in most cases the uncertainty of the length of any particular mission, and the rapidity of the squadron's advance made the establishment of wire communication impracticable, and necessitated the continuous use of radio for long intervals. Even when telephone communication had been established and had become the primary means of communication, a continuous listening watch was kept by squadron headquarters on the squadron command net in order to insure continuous contact with the units in case of the failure of the telephone. In some instances, reliefs of units were so effected that the phone lines laid by the infantry were left intact, and required only the attachment of phones to establish communication. Usually, however, the infantry switchboard had been pulled and the lines left untagged prior to the squadron's arrival for the relief. Phone communications to the troops then became a problem. Wire crews would start "trouble shooting" strange lines, and by the time they could "feel out" the line routes the squadron had been assigned another mission and was ready to move forward. When this happened, radio was used.

After the Rhine was crossed, a series of long movements and short stops necessitated the continued use of radio as the principal means of communication. Wire was occasionally used as a supplement. Our assignments carried us into the mountains of central Europe. Here we were given considerable trouble because of dispersion of units, the unfavorable terrain, and the increased interference from enemy "jamming" stations.

Fortunately we did not remain in this mountainous section for any great length of time, but moved to more favorable terrain, where the units were assembled to perform security patrols in a much smaller zone. This was shortly before VE-day, and as the situation became

*15th Cavalry Reconnaissance Squadron.

more static we began the employment of the telephone again. As field wire, a critical item throughout the campaign, had become practically unobtainable, commercial telephone lines were used to a great extent in establishing such communication at this time. By now we had obtained sufficient captured German telephones and switchboards to efficiently maintain wire communication within the squadron, and between the squadron and the group. This equipment proved its value in the following days, during the readjustment and reassignment of personnel within the group.

Recommendations

In summarizing, it seems well to point out the deficiencies noted during our entire operation on the continent, and to offer the following as recommendations for the improvement of communications in a cavalry squadron:

1. Because of the lack of a -506 radio, frequent complications developed in the maintenance of contact between the squadron and its assault gun troop. An addition to the TO/E of a -506 radio, plus personnel to operate it, would eliminate such complications.

2. A reconnaissance troop carries 12 -506 radios with an authorization of 22 radio operators and assistants. The troop communications sergeant can act as one assistant radio operator, but that still leaves one operator without an assistant. An additional two assistants, (CW) radio operators, would alleviate the situation and allow the communications sergeant to properly supervise communications within the troop.

3. A reconnaissance troop equipped with its 35 radios, which presumably is more than is provided by TO/E for other units of its size, needs an additional radio technician to help maintain its sets, and to insure their continued performance in the event of the loss of key personnel. Replacements for such personnel seemed to be unobtainable throughout our entire continental operation. These technicians should be equipped with a ¼-ton truck for transportation, and a ¼-ton trailer for carrying their maintenance equipment and supplies.

4. The squadron radio technician must be one of the most competent men in the squadron; therefore, it is felt that the rating he carries should be a T/3 rather than the T/4 which is authorized. An assistant squadron technician could also be used and the T/4 rating should be given to him. A ¾-ton truck should be provided as a workshop and a means of transportation. It would give the assistant squadron technician a place for repair work during blackout.

5. Taking into consideration the varying degrees to which wire communication was employed by the squadron, and striking an average, the following recommendation is made for TO/E on wire communication equipment and personnel:

(A) Squadron Headquarters:
- (1) Wire crew—Wire chief—Rating of Sergeant
  - Wireman —T/4
  - Wireman —T/5
  - Driver —Pfc
- (2) Vehicle for wire crew—¾-ton truck
- (3) Wire, W-110-B—6 miles (1 mile to run to each troop), (1 mile for CP and repair).
- (4) Reel Unit, RL-31—1
- (5) Telephones, EE-8-A—7 (1 (CO-EX), 1 (S-3), 1 (-2), (1 Hq. Tr.), 1 (spare), 2 for wire crew test phones).
- (6) Switchboard, BD-72—1
- (7) Switchboard operators—2 with rating of T/5

  Note: The present TO/E authorizes the following:
  - 1 switchboard, BD-71 (6 drop)
  - 5 telephones, EE-8-A
  - 1 RL-27, hand reel for laying wire
  - 3 miles of W-110-B wire on DR-4

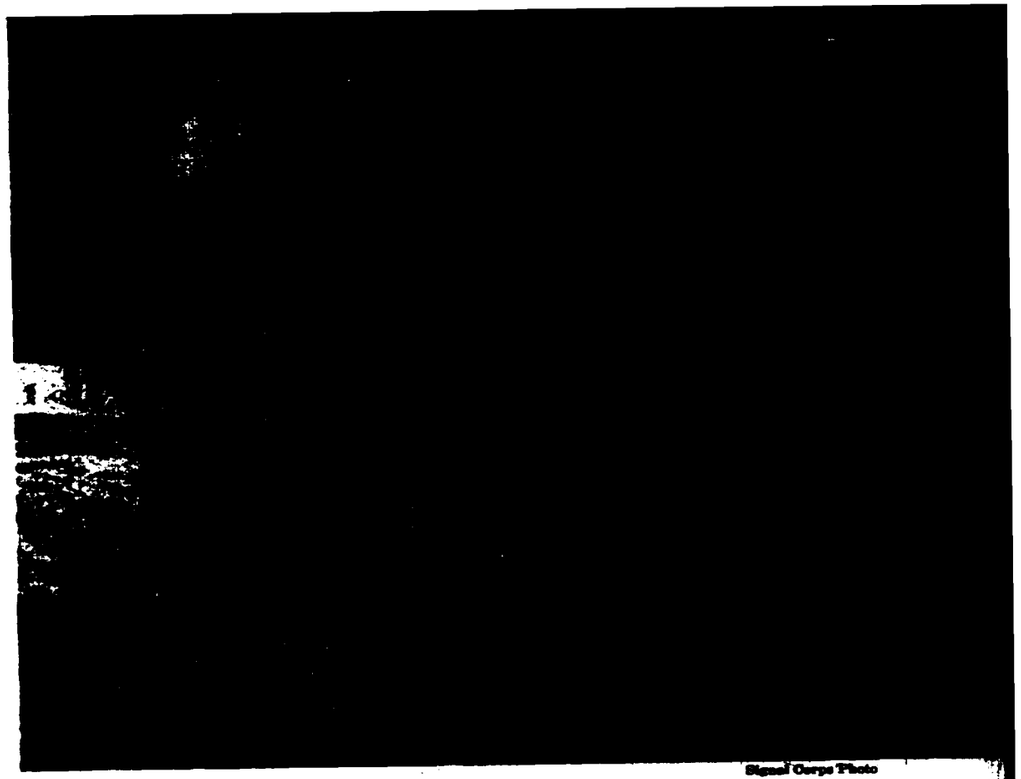
(B) Reconnaissance Troop:
- (1) Wire crew—Crewman with a rating of T/5
  - Wire —Crewman with a rating of Pfc.
- (2) Vehicle for wire crew transportation and carrying wire crew equipment
- (3) Wire, W-130—3 miles (1 mile to reach to each platoon)
- (4) CE-11, reel equipment—3 (includes 1, TS-10 handset each)
- (5) TS-10, handsets—6 (2 per platoon)
- (6) Telephones, EE-8-A—5 (1 (CO), 1 (EX), 1 each platoon)
- (7) Switchboard, BD-71—1
- (8) Switchboard operators—2 ratings of T/5

  Note: Present TO/E is as follows:
  - 1, ½ mile, W-130 wire
  - 3, CE-11, reel equipment
  - 3, TS-10, handsets

(C) Assault Gun Troop, and Tank Company:
- (1) Same recommendations as per reconnaissance troop

  Note: The present TO/E does not authorize wire communication equipment or personnel for either of the above units.

With the equipment and personnel suggested in the preceding paragraphs, it is felt that a cavalry squadron would be prepared to perform missions of the types it was assigned during the campaigns on the continent.



Signal Corps Photo

Members of a tank destroyer unit of the U. S. Ninth Army guarding a roadway in Germany, January 22, 1945.

The 11th Cavalry Group in a series of actions

The Battle of the Roer

On December 11, 1944, the 11th Cavalry Group marched out of Holland and into the front lines in Germany. Assigned to the Ninth U. S. Army, and attached to the XIII Corps, the 11th Cavalry's initial combat mission was to relieve the 406th Infantry Regiment of the 102d Division, which was defending an area between Linnich and Lindern, Germany, near the Roer River. Organized and trained for war of movement, the troopers nevertheless adapted themselves so readily to the doughboy rôle that they drew nothing but praise from both division and corps commanders.

On December 12, group and squadron headquarters established CPs in Gereonsweiler. The reconnaissance and tank units parked their vehicles in the rear areas and walked into the line. The assault guns were attached to the 102d Division Artillery for fire missions in direct support of the sector.

Troops on the line during this period came into contact with Nazi propaganda through a loud-speaker which broadcast musical recordings intended to make the Yanks long for home. Propaganda leaflets, sent over in base-ejection artillery shells, had the same intent and bore themes which revealed the depraved, unscrupulous Nazi character.

On December 22 the group was relieved by the 406th Infantry and reassigned a sector just south of Linnich on the Roer River. The CP was established at Setterich, and the 36th was directed to defend the assigned sector and the 44th was placed in mobile division reserve. The assault gun troops were shifted to Ederen and attached to the 252d Field Artillery Battalion for fire missions. On December 23 the group moved its CP to Ederen, and the 44th Squadron relieved elements of the 406th Infantry near Linnich.

Intensive patrolling was again resumed, with the added difficulty of crossing the Roer River each time.

On December 26-27 a patrol, consisting of 18 enlisted men of Troop A, 36th Squadron, and led by Lt. Colonel Candler, Squadron CO, crossed the Roer near Tetz on a footbridge constructed for that purpose by the engineers. Aided by Major Krampitz and Lieutenant Sullivan, Colonel Candler led the patrol toward Tetz until it was pinned down by barbed wire, rifle and burp gun fire. Major Krampitz eliminated the burp gunners by grenades, and the patrol proceeded until broken up by heavy mortar concentrations.

By 2350 the patrol had returned in small groups, except for three officers and three enlisted men. The two field officers, now alone, continued on the mission and ran a 9-mile gauntlet of sentries and groups of Germans to capture a prisoner. While the officers were endeavoring to return, the prisoner fell into the river

and his shouts drew fire from the Germans. Major Krampitz received a flesh wound and the prisoner escaped.

The officers returned at 0150 and at 0245 Colonel Candler again led a platoon across the Roer to rescue the others who were missing. The force met heavy fire. Colonel Candler was wounded and they were forced to return at 0530 without accomplishing their mission.

At this time the great German counteroffensive into Belgium and Luxembourg was nearly two weeks old and with fanatical fury the Nazis had pushed a bulge almost to the French border. Many combat units had been pulled out of the line in static sectors and thrown into the battle to halt the Nazi offensive. This resulted in a considerable thinning of the line in the XIII Corps' sector, and eventually the 11th was occupying the same front originally held by the 102d Division when the group was committed.

In addition to the sector's enlargement, the new year, 1945, brought with it a new directive for harassing the enemy. Plans were immediately instituted to carry it out. A "Commando" platoon, composed of volunteers from all group units, was organized to operate as a combat patrol under the personal direction of the group commander. Dummy tanks were constructed, provisional weapons units were formed, and a scheduled firing of pyrotechnics were all coördinated with other activity of the reserve tank company.

The program got under way early January 2 when Company F of the 36th ran its tanks along the roads of the front, and the provisional .50 caliber machine guns opened up on the enemy position. As expected, this activity drew heavy artillery fire from the Germans, which promptly was neutralized by our counterbattery fire. The dummy tank positions also drew enemy fire.

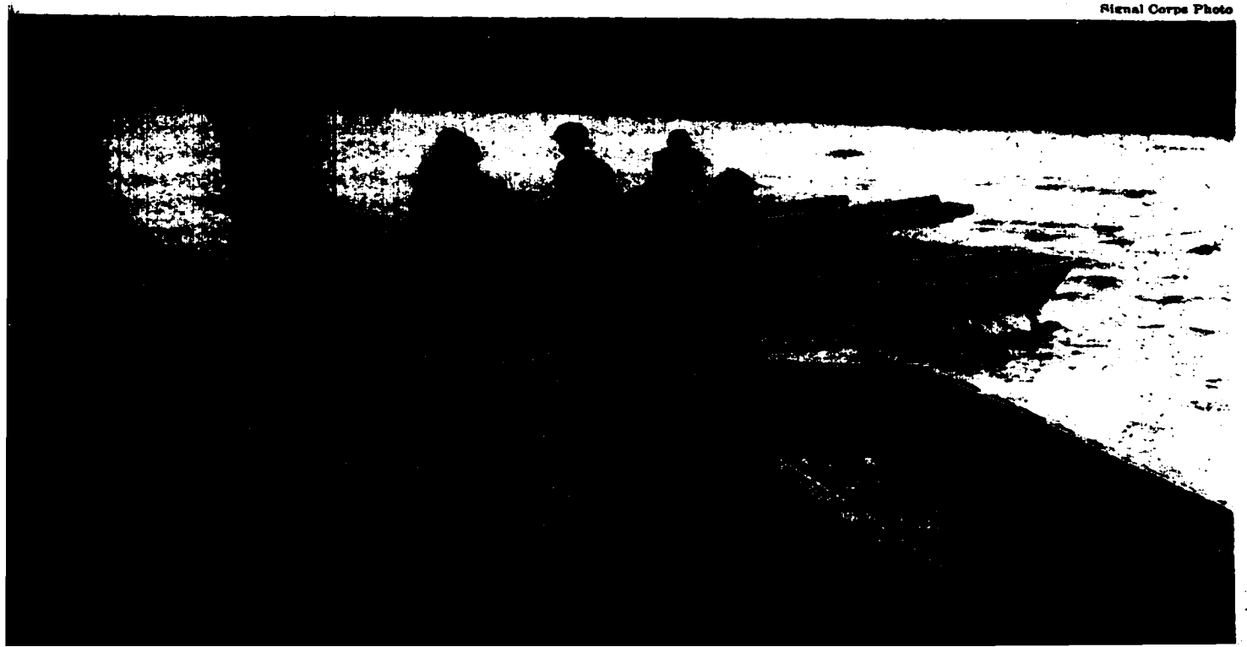
The program was effectively climaxed on January 6 by the "Commando" platoon in an elaborately planned raid designated as operation "Cleaver." Its objective was the destruction of a troublesome troop shelter from which the enemy launched harassing operations into our sector. Led by two officers, the patrol moved to its forward assembly area after hundreds of rounds of artillery and mortar shells had been poured into the adjacent enemy positions. Covered by a smoke screen, the "Commandos" jumped off at 1630, and quickly achieved their objective before the surprised enemy could open up.

Covered by the rest of the patrol, two men of Company F, 44th Squadron, entered the shelter and placed a 40-pound charge of TNT, which completely destroyed it. After eliminating all enemy resistance near the objective, the patrol withdrew under heavy fire of all types, and narrowly escaped being cut off by the enemy, who had infiltrated behind it.

No detail had been neglected in planning the patrol's operation. One which possibly saved many lives was the foresight which resulted in running a wire line from the 102d Division Artillery fire direction center to the colonel's OP, which was in the attic of a house on the outskirts of Linnich, immediately adjacent to the terrain over which the combat patrol operated. The attack of our combat patrol was the signal for the enemy to fire on Linnich with all their artillery. The artillery FO was heard to tell the fire direction center that his OP was getting too hot and that he was withdrawing. Shells were bracketing the colonel's OP, and one crashed through the attic in which his party was located. Realizing that to withdraw would leave the patrol without artillery support, the colonel ordered the

U. S. Ninth Army engineers build an assault bridge across the Roer in Germany.

Signal Corps Photo



enlisted men to the basement below, and, with Captain (now Major) Brett, Captain (now Major) Todd, and Captain E. C. Jones, 44th Squadron, who refused to retire, the colonel personally acted as FO and directed the fire of the division artillery until completion of the action. The patrol's officers later stated that without the help of our artillery all the patrol would probably have been killed.

On January 13, the 17th Reconnaissance Squadron was attached to the group and was sent into the Linnich sector to relieve the 44th Squadron, which was sent back to a rest camp for maintenance and orientation.

The 36th Squadron, still on the line, continued to conduct aggressive patrolling over the Roer River. On the night of January 16-17, a volunteer patrol of Troop C crossed the Roer, assaulted a strongly defended troop shelter, captured a prisoner, and, after blowing up the shelter, successfully returned with the prisoner. This outstanding success was achieved because careful planning and reconnaissance had been carried out for 72 hours beforehand. (*This is apparently the same patrol operation as described in great detail in the article "Operation Snare," also appearing in this issue.*—EDITOR'S NOTE.)

During this period, the British were attacking steadily in the 21st Army Group's sector immediately to the north in order to extend their lines to the Roer River in preparation for the great spring offensive. From Linnich to the northern boundary of the American XIII Corps' sector, the battle line had not been extended to the river. Consequently, it was necessary for the corps to coördinate an attack with the British drive which would clear the western side of the Roer for use as a springboard in the big drive to come. This attack was designated as operation "Swift" and certain supplementary missions were assigned the 11th Cavalry Group.

A deserter picked up by the 36th on January 25 at 2300, volunteered the information that most of the Germans had retired across the river. Three patrols from the 44th Squadron immediately were sent to verify this information. One of the patrols pushed into the outskirts of Brachelen under sporadic enemy fire, and found that the town was only lightly held by a delaying force.

As a result of the indicated enemy withdrawal, H Hour was advanced from 1000 to 0630, January 26, and the lavish artillery preparation which had been planned was cancelled in order that the dawn attack might be a surprise.

Troop B spearheaded the 36th's attack, with A and C in support, and soon occupied the objective. Heavy fire was immediately received from Gut Rischmuhle and, although it was an infantry objective, Troop C, moving around the left flank, captured it and flushed 23 Germans into the arms of Troop B. The 17th Squadron moved out to occupy its objective and at 0853 the division announced that all objectives had been taken. At 0920, corps announced that the operation had been completely successful.

Operation Snare

*by Captain John E. Newlin**

ON the bitterly cold night of January 17-18, a 30-man combat patrol was to cross the Roer River in a mission known as "Operation Snare," to capture a prisoner for identification and to blow up a troop shelter.

The enemy situation along the front at the time was static. Jerry activity had been limited to small patrols, sniper fire, and intermittent artillery.

PATROL PLANNED IN DETAIL

Since the weather was extremely cold, it was considered essential that all of the men be gotten across without getting wet in order not to impair their efficiency. In order to avoid detection the crossing also had to be made with maximum quiet and reasonable speed.

To determine the best means of crossing, all river characteristics were carefully noted, including the depth, width, current, banks and bottom of the river, and a list made of the methods available—with favorable and unfavorable comments—as follows:

BRIDGE: *Favorable*—men could cross without getting wet. *Unfavorable*—too much time and too many persons required for construction. Too noisy. Too easily knocked out. *Decision*—not practical.

FORD: *Favorable*—quick and noiseless. *Unfavorable*—men would get wet and thus become too cold to work efficiently. Bottom of stream slippery. *Decision*—not practical for the initial crossing, but satisfactory for return trip provided a guide line was employed to help the men hold their feet in the swift current.

BOAT: *Favorable*—quiet and quick. Men would be dry upon reaching other side. *Unfavorable*—river current would make crossing difficult. Drift. *Decision*—if a light boat was used it would be likely to overturn. An engineers' boat would be heavy and require too much personnel to handle. A light rubber boat, therefore, should be used, and instead of using paddles, it should be swung across like a pendulum, using a rope

*Commanding Troop C, 36th Cavalry Reconnaissance Squadron.

tied to the bow of the boat and anchored ashore.

Our patrol had been given the mission 4 days in advance. Two nights before the jump-off, a 4-man reconnaissance patrol crossed the river to definitely locate the enemy positions, and to test the practicability of this method of boat crossing, which had not been tried by this troop. The patrol returned and reported the test to be satisfactory. The enemy positions located were recorded, and a plan of action was drawn up in the minutest detail.

Plan of Operation

Although the actual crossing was to be made by 28 men and two officers, the services of the rest of the troop were required to accomplish the mission. A boat detail of 4 men was to provide transportation, and two 6-man covering forces were to protect the boat party. Once across the river, a two-man team was to proceed upstream and anchor a rope, the loose end of which was to be thrown to a man on the near bank to be secured. The rope was to be used to assist the men across the river when they returned.

A covering party was to take position near the anchored end of the rope on the enemy shore to prevent this route of escape from being cut off. The remaining 23 men and two officers were to go forward and assault the shelter, capture the prisoner, and then blow up the shelter with satchel charges carried by a demolition party.

For several days before the operation, 60mm mortars fired on likely enemy targets, shooting sporadically to simulate random fire. On the night of the operation, one mortar battery laid diversionary fire to the patrol's left flank. Another battery, which had been registered on the patrol's objective, was to fire only on call. The 81mm mortars in the center of the squadron's sector were registered on known enemy positions that might give trouble. The .50 caliber machine guns along our base of fire were sighted-in, and limiting stakes were set.

One section of a footbridge was carried for use in crossing a small creek which adjoined the launching site. Every possible precaution was taken to keep the men's feet dry.

Direct phone communication was provided from the launching site to the FO, mortars, and base of fire by telephone wire which was laid over two widely separated routes. The patrol leader carried a -536 radio, and another was kept with the telephone at the launching site from which the entire operation was to be coordinated. In the event the radio failed and the patrol had to change its route, the patrol leader was to signal back with a flashlight with a lens blacked-out except for a pin-point hole. No code would be needed, as an alternate route had previously been chosen.

All of the patrol members were volunteers. During the two days preceding the operation they were briefed, assigned jobs, and spent every daylight hour studying the terrain. An overlay of all concentrations was memorized since map reference would be difficult at night.

The patrol was scheduled to start crossing in rubber assault boats at 2100, January 17. The night was clear and cold and the ground covered with snow. At 2000, the boat detail arrived at the launching site with rope, boat and the section of bridge for crossing the creek. At the same time the two covering parties went into position on either side of the launching site. At 2100 the white-clad patrol, moving with 5-yard intervals between men, could barely be seen approaching the spot where the boat detail waited for them.

The first three men climbed aboard, and the rope was let out. The boat drifted with the current, its bow upstream, and, upon reaching a bend, was forced by the current against the enemy shore.

The men disembarked, and the boat was pulled back to the near shore. Ten loads were ferried across in little more than 10 minutes. Unaimed fire from burp gunners came through the trees overhead. Our mortars fired TOT about 200 yards downstream.

The patrol crept forward, anchored the rope, and provided a covering guard for it. A German 42 MG opened up to the left of the objective. A .50 from our base of fire sent a stream of red tracers in its direction, and the 42 stopped firing.

Holding its fire, the patrol advanced toward the shelter, which could be seen ahead. It was protected by barbed wire. Just outside the entrance was a trench in which stood a sentinel. Hand grenades were lobbed into the trench, and two men jumped into it and captured a prisoner.

The satchel charges were brought up and passed over the wire, but just before the fuse was lighted three machine guns began firing from a communication trench 100 yards behind the shelter. The fire pinned the men to the ground. Artillery concentration Number 6 whistled overhead. The machine guns ceased firing and the fuse on the satchel charge was lighted.

The patrol withdrew to the place where the rope was anchored and returned with the prisoner through the swift, icy water, holding on to the rope to keep heads above water. The Germans began firing with machine guns, and were answered by our .50s along the base of fire. Enemy artillery opened up, and the FO counterbatteried with TOT close-in to assist the withdrawal.

Conclusion

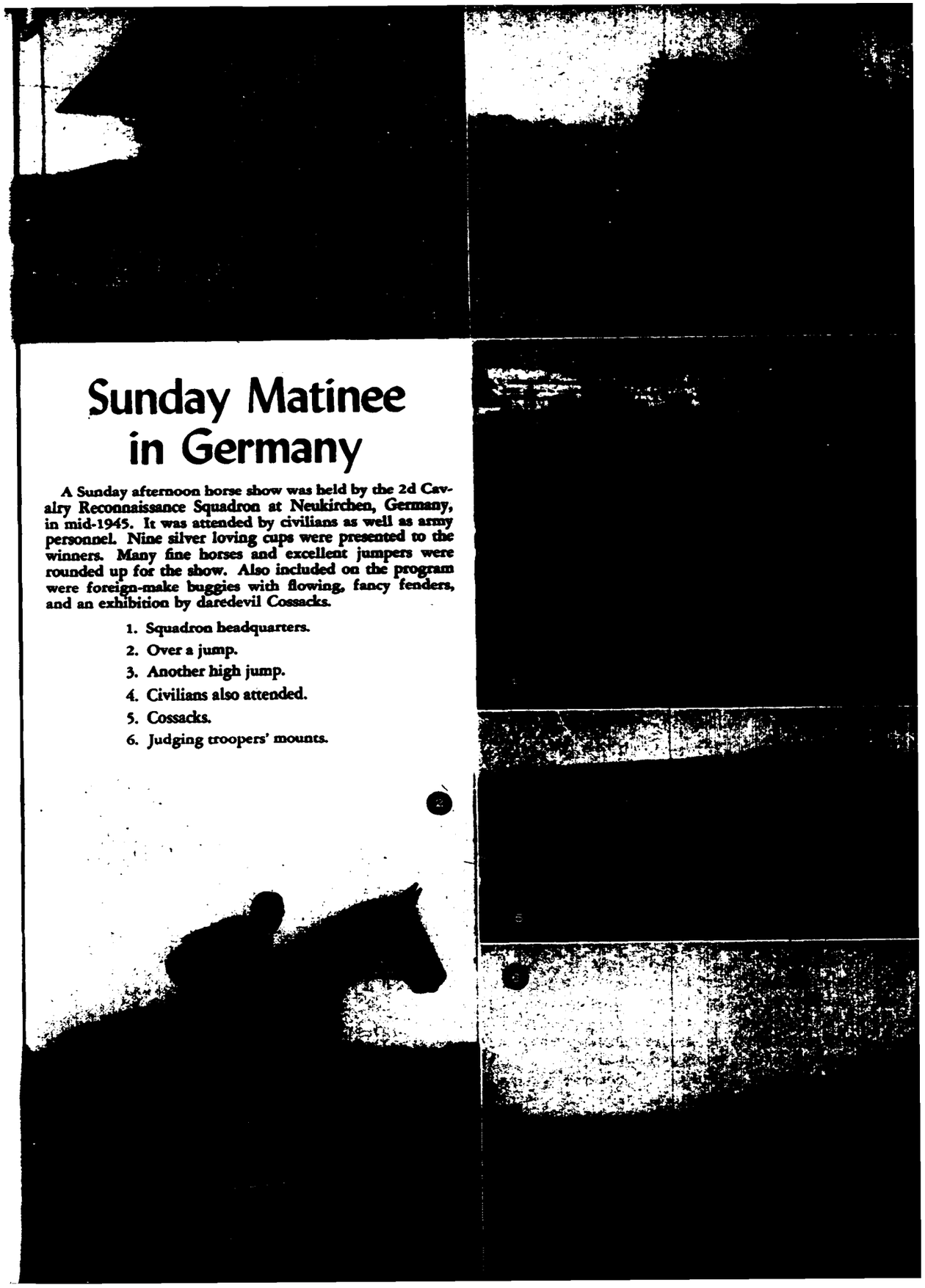
The operation was successful because the basic principles of patrolling were followed to the letter. Such principles are usually not intentionally or carelessly overlooked; but often they are not carried out because the tactical situation allows insufficient time to fulfill them.

To make a successful night patrol there should be sufficient time: To make a personal reconnaissance; organize a careful plan; select patrol members; brief and allow all personnel to study the ground over which they are to work; and to assemble the equipment.

Sunday Matinee in Germany

A Sunday afternoon horse show was held by the 2d Cavalry Reconnaissance Squadron at Neukirchen, Germany, in mid-1945. It was attended by civilians as well as army personnel. Nine silver loving cups were presented to the winners. Many fine horses and excellent jumpers were rounded up for the show. Also included on the program were foreign-make buggies with flowing, fancy fenders, and an exhibition by daredevil Cossacks.

1. **Squadron headquarters.**
2. **Over a jump.**
3. **Another high jump.**
4. **Civilians also attended.**
5. **Cossacks.**
6. **Judging troopers' mounts.**



Horse Cavalry in the Philippines

*by Major Harold D. Steward**

I HEARD more than one commander in the 1st Cavalry Division remark on the way to Manila, "I would give anything for a squadron of horse cavalry right now . . ."

Horse cavalry, in the opinion of the writer, would have been highly effective in the Luzon campaigns, and especially successful during the 1st Cavalry Division's drive on Manila in early February, 1945.

The mountains and rugged terrain where roads were either nonexistent or difficult would have been ideal for a mounted cavalry division.

During the drive on Manila by the 1st Cavalry Division, only enough transportation was available to motorize two squadrons of the dismounted division which formed the "flying column" that entered the city. The remainder of the division had to walk. The result was that after each day's advance the gap between the advance elements and the supporting elements became wider. With horse cavalry, spearheaded by tanks, this would not have happened.

As the Japs retreated before the 1st Cavalry Division they blew every bridge along the route to Manila. The American advance was held up while these bridges were repaired in order to permit the attack to continue. Bridges would not have been necessary for horse cavalry.

When the two advance squadrons of the 1st Cavalry Division had entered Manila, they were without reinforcements for more than a day. This occurred because the motorized column moved too fast for the elements on foot, and because the Japs had blown the large steel bridge at Novoliches which made it necessary to build a by-pass for the supporting elements.

Throughout the war in the Pacific, the Japs have used piecemeal attacks, which usually employed one or two companies of infantry, and never more than a battalion. Horse cavalry, which is an arm of speed, could easily have outflanked the Japs when they used such tactics. It could have rapidly brought heavy machine guns and artillery pieces into action on the flanks and in the rear of the enemy. In areas where there were no roads such tactics were impossible for the motorized units, and the foot soldier was incapable of carrying heavy artillery on his back. The surprise from an attack by trained horse cavalry would have resulted in many instances in a Jap rout.

During the fighting in the western mountains of Leyte, the 1st Cavalry Division recruited local horses to be used in pack trains for transporting supplies and equipment to combat troops high in the rugged hills. The answer here would have been pack trains of army mules. Because there were no mules and not enough horses, most of the supplies were carried through the mountains by soldier-pack carriers. The use of combat personnel as pack carriers not only reduced the fighting strength of the division, but also limited the quantity of supplies that could be carried to the troops who were in action.

*Former 1st Cavalry Division Officer.

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Samurai Swords Commemorate Cavalry Heroes

SIXTEEN historic Samurai swords, for centuries the emblems of Japan's now vanquished military might, are to become a part of U. S. Army traditions. They will be used by the 8th Regiment of the 1st Cavalry Division to establish a new ceremony for the passing of command in its units. The swords were surrendered to the regiment by Japanese military commanders when the 1st Cavalry Division occupied Tokyo.

The new ceremony is designed to keep alive the memory of regimental heroes and those who gave their lives on the long march across the Pacific to Tokyo, and to retell the story of the organization's bloody progress for the benefit of succeeding generations of men serving with the outfit.

A sword bearing the name of a hero from the unit has been presented to each squadron and troop commander of the regiment. Each sword will be known by the name of the officer or enlisted man to whom it is dedicated.

When a commander of a unit is relieved from duty, an appropriate regimental ceremony will be held at which he will present the sword to his successor as a symbol of command. At the ceremony, a brief account of the exploits or death of the man to whom it is dedicated will be read by the regimental adjutant.

"Through this custom, the officers now living, who fought beside those who bled and died, hope to perpetuate their memories and thus hand down to succeeding generations some of the bloody memories and a bit of the glory that was the 8th Cavalry's during those historic days in the Pacific," Colonel W. J. Bradley, commander of the 8th Cavalry Regiment, said in announcing the new ceremonial.

Jungle Pack Operation

Time, Inc.

Route of the 5307th Regiment into India and Burma led through heavy, wet jungles, mountain ranges and rivers.

From February 1 to June 1, 1944, the 5307th Provisional Infantry Regiment, a part of Merrill's Marauders, marched 700 miles through the jungle terrain of India and Burma. Heavy weapons and radios, and supplies from air drops were transported by pack animals.

THE 5307th Provisional Infantry Regiment inflicted several thousand casualties upon the Japanese during its campaign in India and Burma. The general plan was to aid the Chinese troops in securing as much room as possible for the Ledo Road. The tactical plan of the Marauders was to operate in the enemy's rear, sever his lines of communication, and force him to attack over ground chosen by the Marauders in order to restore his supply route. This strategy in coordination with the Chinese offensive brought defeat to the Japanese in that section of Burma, and eventually resulted in the fall of Myitkyina.

Organization and Training

The 5307th was a provisional infantry regiment which was organized for a specific type of mission on a special T/O and E. It was based on the "column"—a tactical grouping of weapons and personnel developed by General Ord Wingate for his raid into Burma in 1943. As finally modified and developed the regiment included a regimental headquarters and headquarters company, three battalions, and two quartermaster pack troops whose animals and personnel were divided among the three battalions.

Each combat team contained an infantry company, a reconnaissance platoon, a pioneer and demolition platoon, and a weapons platoon. Heavy weapons, radios, and supplies were to be transported by pack animals, and the regiment was to be supplied by air.

Prior to the opening of the campaign, the 5307th trained intensively for a short time. Although most of the men were seasoned soldiers, they had not worked together as a unit; nor had they been trained in animal care and management, or in pack transport upon which the unit was dependent to maintain a supply level between air drops.

The regiment began training in November, 1943, but various factors forced its employment in combat before it normally would have been committed. It marched down the Ledo Road on February 1, 1944, to begin a 6-month period of almost constant action or movement. *The deficiencies resulting from insufficient training with the pack animals became apparent at once, and constituted a serious handicap to the unit during the campaign.*

Animals

Horses: On January 1, the 5307th received its initial contingent of 700 pack animals, which were recognized as part of the 112th Cavalry mounts from the previous year in New Caledonia. Their condition had declined greatly, but 140 of the best animals were chosen for the 5307th. Two weeks later 200 more horses were obtained from the same source.

There was little time to train and condition the 340 animals. An unknown number had been used as weapons pack animals. It was necessary to break the majority of the animals a second time, however, as they had not been used in many months.

Under normal circumstances, a training program would have been initiated to improve the condition of the animals, train them to willingly accept and march under packsaddle and load, and fit and adjust their individual pack equipment. Because of the exigencies of the situation, such training could not be accomplished. The animals were groomed, fed, and shod, and a few short marches were undertaken which dem-

onstrated their poor condition and the lack of animal training on the part of their infantrymen handlers.

Packsaddles, pads and accessory equipment could not be adjusted until the march down the Ledo Road began, when many of the men led their particular pack animal for the first time. A number of the packsaddles, which were on the animals' backs for the first time, did not fit, and nearly every animal in the regiment developed a sore back. The men were untrained in preventative measures and knew nothing about "chambering" a saddle pad to immobilize a sore back to permit it to heal and consequently the sores grew continually worse.

The poor condition of the horses at the beginning of the campaign, and the lack of care due to inadequately trained animal personnel, resulted in excessive non-battle casualties. During the campaign the horses steadily lost condition and weight. Most of them died from exhaustion, were destroyed, or killed by enemy fire.

Mules: The 360 mules in the regiment had been trained as pack animals in the States, and were employed with far greater success than the horses. Casualties among them were not excessive. The personnel had been adequately trained, and although the animals were out of condition after the long voyage from the States, the mules actually gained in condition during the opening phase of the campaign. Their average weight had declined at the end of the 700-mile march, but a short rest would have restored most of the animals to a normal condition. The value of the previous training was reflected in the fact that, of the 700 animals which began the campaign, nearly all of the 250 animals which survived it were mules.

Equipment

The versatility of the Marauders in the employment of their weapons was a factor which contributed largely to their success.

Weapons favored in jungle warfare—where heavy fire fights often occurred at a range of from 40 to 10 yards—were the Thompson submachine gun, the .30 carbine, the M1, the BAR, mortars, grenades, and light and heavy machine guns.

Lack of artillery support was keenly felt during the initial stages of the campaign, and 75mm pack howitzers finally were requested and obtained by air drop. They proved to be excellent weapons for jungle employment and added considerable punch to the Marauders' offensive operations.

Animal Equipment

Standard animal and pack equipment was used and proved satisfactory. The Phillips cargo saddle was used on the mules, and the "*China Special*" on the horses. The China Special was considered unsatisfactory because it was too small and could not be made to fit. Riding animals were equipped with the McClellan saddle, or the standard packer's riding saddle, full-rigged. Standard adapters and hangers also were used for weapons loads. It was necessary, however, to design and construct hangers and adapters for transporting radios by pack. Animal equipment satisfactorily withstood the hard wear of the campaign. Considerable equipment was lost, destroyed, or abandoned when the animals carrying it became casualties, but that which remained at the end of the campaign was still serviceable and required only cleaning and repairs to restore it.

Mule skinners of the Mars Task Force, operating on a similar mission, lead mules through a river enroute to Bhamo.
Signal Corps Photo

Feed and Forage

General: The regiment depended entirely upon air supply for food, ammunition, and other supplies of all types, including grain rations. Grain was dropped free (without cargo parachutes). The system was dependable, and with few exceptions grain rations were always available for the animals. Near the close of the campaign one combat team missed an air drop. Its animals, already in poor condition, were without grain for 5 days and began to collapse from exhaustion. Even this single mishap was not due to failure of the air supply system.

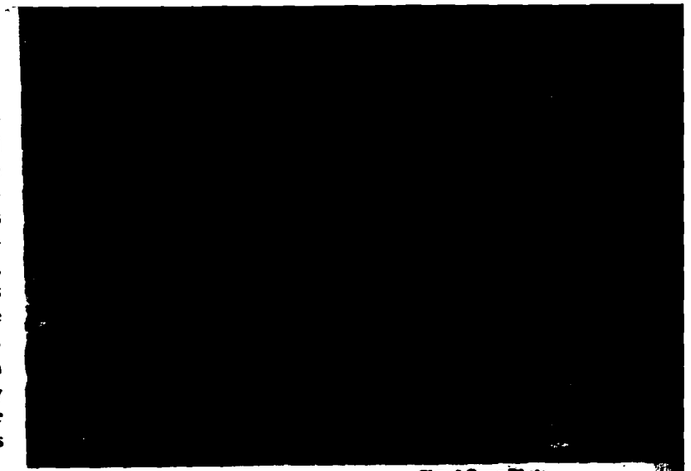
Grain: Grain rations were drawn from the British and consisted of 8 to 10 pounds of a half-and-half barley and gram (also called "chick" peas) mixture. The gram, when crushed, resembled ground peas. This ration was adequate.

Forage: Until the regiment left the Ledo Road, hay and grain could be drawn from near-by units. One outfit even had a small stock of alfalfa which it shared with the Marauders. Prairie hay also was available occasionally, but it ordinarily had been chopped fine and compressed into small bales. In feeding it was necessary to spread it on the ground which resulted in excessive waste.

Green Forage: Plenty of green forage was available along the 700-mile route of the 5307th. It was of sufficient quality to add the required bulk to the animal diet. Both horses and mules developed a great liking for green bamboo tops. The men cut them and the animals ate all they could get.

Packing: Only a few more than 200 men in the regiment were trained in the techniques of pack transportation and animal management. They were largely responsible for the successful employment of the 700 pack and riding animals. Since in the jungle it was a full-time assignment for one man to be responsible for one animal, it was necessary to detail infantrymen as mule skinners. Experience was a hard teacher but, as the weeks passed, doughboys learned to tie lash ropes with knots that would not work loose and to pack loads which would stay on the saddle. They gradually came to understand their animals, their individual characteristics, capabilities, and limitations.

Packmaster: The duties of packmasters were heavy and manifold, particularly at the beginning of the campaign. During the march, packmasters moved up and down the column to check the lashing and balance of loads, and the fit and adjustment of equipment. It often was necessary to lead an animal off the trail, unload his cargo, adjust the saddle equipment to prevent a sore back, and replace the load. The doughboys attended pack school beside the trail as packmasters explained the adjustment of a saddle pad or demonstrated how to balance and lash a particular type of load. When bivouac was established at night, the packmasters' working day continued. Saddles were adjusted, pads were fitted, and equipment was swapped from one animal to another in order to achieve a proper fit. Another nightly task was to chamber the pads to facilitate healing of the numerous sore backs. The packmaster also supervised the care of the animals, and since the doughboys were unfamiliar with such details, a considerable amount of persuasion, instruction, and demonstration was required to convince a trail-weary infantryman that it was necessary to feed, water, and groom the animals and examine their feet prior to opening his own rations. The packmaster's duties became somewhat less stringent as the campaign progressed and the inexperienced packers became familiar with their duties.



Signal Corps Photo
Soldiers lead pack mules through a trench up a 1,200-foot slope to a supply dump. Note plane in upper left corner.

Cargador: The duties of the cargadors were equal to those of the packmasters. Each night, they supervised the unpacking and stacking of cargo and equipment, and planned the assignments of cargo for the next day's march. The cargadors also acted as saddlers, and repaired broken animal equipment. Each morning when the cargo was packed, they assigned loads to individual animals and supervised the preparation, loading, and lashing of the cargo. The cargador also assumed the duties of the packmaster during the latter's absence.

Loads: Hanger loads consisted of weapons, radios, and ammunition. General cargo loads were made up of ammunition, rations, medical and other supplies. In addition, each animal also carried his own grain ration. Loads for horses weighed 150 to 200 pounds, for mules from 200 to 275 pounds. The lower weight was preferred.

Marches: On marches there was no pack train in the usual sense. Normal provisions were made for security, communication, and control, and these were adapted to meet whatever circumstances were imposed by terrain and the situation. Pack animals were as much a part of the platoons as the weapons and supplies they carried. A man was assigned to lead each animal since it was not practicable to attempt herding. Neither was it possible to tie two or more animals' heads and tails together, for they invariably became tangled in the heavy undergrowth.

Terrain: The terrain traversed during the 6-month

contained their poor condition and the lack of animal training on the part of their inexperienced handlers.

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The versatility of the Marauders in the employment of their weapons was a factor which contributed largely to their success.

Weapons favored in jungle warfare—where heavy fire fights often occurred at a range of from 40 to 10 yards—were the Thompson submachine gun, the .30 carbine, the M1, the BAR, mortars, grenades, and light and heavy machine guns.

Lack of artillery support was keenly felt during the initial stages of the campaign, and 75mm pack howitzers finally were requested and obtained by air drop. They proved to be excellent weapons for jungle employment and added considerable punch to the Marauders' offensive operations.

Animal Equipment

Standard animal and pack equipment was used and proved satisfactory. The Phillips cargo saddle was used on the mules, and the *"China Special"* on the horses. The China Special was considered unsatisfactory because it was too small and could not be made to fit. Riding animals were equipped with the McClellan saddle, or the standard packer's riding saddle, full-rigged. Standard adapters and hangers also were used for weapons loads. It was necessary, however, to design and construct hangers and adapters for transporting radios by pack. Animal equipment satisfactorily withstood the hard wear of the campaign. Considerable equipment was lost, destroyed, or abandoned when the animals carrying it became casualties, but that which remained at the end of the campaign was still serviceable and required only cleaning and repairs to restore it.

Mule skinners of the Mars Task Force, operating on a similar mission, lead mules through a river enroute to Bhamo.
Signal Corps Photo

General. The regiment depended entirely upon air supply for food, ammunition, and other supplies of all types, including grain rations. Grain was dropped free (without cargo parachutes). The system was dependable, and with few exceptions grain rations were always available for the animals. Near the close of the campaign one combat team missed an air drop. Its animals, already in poor condition, were without grain for 5 days and began to collapse from exhaustion. Even this single mishap was not due to failure of the air supply system.

Grain: Grain rations were drawn from the British and consisted of 8 to 10 pounds of a half-and-half barley and gram (also called "chick" peas) mixture. The gram, when crushed, resembled ground peas. This ration was adequate.

Forage: Until the regiment left the Ledo Road, hay and grain could be drawn from near-by units. One outfit even had a small stock of alfalfa which it shared with the Marauders. Prairie hay also was available occasionally, but it ordinarily had been chopped fine and compressed into small bales. In feeding it was necessary to spread it on the ground which resulted in excessive waste.

Green Forage: Plenty of green forage was available along the 700-mile route of the 5307th. It was of sufficient quality to add the required bulk to the animal diet. Both horses and mules developed a great liking for green bamboo tops. The men cut them and the animals ate all they could get.

Packing: Only a few more than 200 men in the regiment were trained in the techniques of pack transportation and animal management. They were largely responsible for the successful employment of the 700 pack and riding animals. Since in the jungle it was a full-time assignment for one man to be responsible for one animal, it was necessary to detail infantrymen as mule skinners. Experience was a hard teacher but, as the weeks passed, doughboys learned to tie lash ropes with knots that would not work loose and to pack loads which would stay on the saddle. They gradually came to understand their animals, their individual characteristics, capabilities, and limitations.

Packmaster: The duties of packmasters were heavy and manifold, particularly at the beginning of the campaign. During the march, packmasters moved up and down the column to check the lashing and balance of loads, and the fit and adjustment of equipment. It often was necessary to lead an animal off the trail, unload his cargo, adjust the saddle equipment to prevent a sore back, and replace the load. The doughboys attended pack school beside the trail as packmasters explained the adjustment of a saddle pad or demonstrated how to balance and lash a particular type of load. When bivouac was established at night, the packmasters' working day continued. Saddles were adjusted, pads were fitted, and equipment was swapped from one animal to another in order to achieve a proper fit. Another nightly task was to chamber the pads to facilitate healing of the numerous sore backs. The packmaster also supervised the care of the animals, and since the doughboys were unfamiliar with such details, a considerable amount of persuasion, instruction, and demonstration was required to convince a trail-weary infantryman that it was necessary to feed, water, and groom the animals and examine their feet prior to opening his own rations. The packmaster's duties became somewhat less stringent as the campaign progressed and the inexperienced packers became familiar with their duties.

Signal Corps Photo
Soldiers lead pack mules through a trench up a 1,200-foot slope to a supply dump. Note plane in upper left corner.

Cargador: The duties of the cargadors were equal to those of the packmasters. Each night, they supervised the unpacking and stacking of cargo and equipment, and planned the assignments of cargo for the next day's march. The cargadors also acted as saddlers, and repaired broken animal equipment. Each morning when the cargo was packed, they assigned loads to individual animals and supervised the preparation, loading, and lashing of the cargo. The cargador also assumed the duties of the packmaster during the latter's absence.

Loads: Hanger loads consisted of weapons, radios, and ammunition. General cargo loads were made up of ammunition, rations, medical and other supplies. In addition, each animal also carried his own grain ration. Loads for horses weighed 150 to 200 pounds, for mules from 200 to 275 pounds. The lower weight was preferred.

Marches: On marches there was no pack train in the usual sense. Normal provisions were made for security, communication, and control, and these were adapted to meet whatever circumstances were imposed by terrain and the situation. Pack animals were as much a part of the platoons as the weapons and supplies they carried. A man was assigned to lead each animal since it was not practicable to attempt herding. Neither was it possible to tie two or more animals' heads and tails together, for they invariably became tangled in the heavy undergrowth.

Terrain: The terrain traversed during the 6-month

campaign often was difficult, and demands were severe upon the physical strength of man and animal. The topography included rivers, swamps, and 6,000-foot mountains. After April, the outfit seldom was dry and was seldom out of the mud. Animals frequently bogged down and it became necessary to unload the cargo, remove the saddle, and haul them out bodily. Consequently, the rate of march was variable. It was almost impossible to conform to a schedule, and distance was customarily estimated by time rather than miles.

Jungles: The Burmese jungle was of three general types. Virgin growth, or "primary jungle," consisted of giant trees and thick undergrowth through which it was necessary to cut trails. Visibility often was less than 10 feet and sunlight seldom touched the ground. Secondary jungle was less thick, and only an occasional vine had to be cut to clear a trail. Clearings (savannahs) were not infrequent and there were occasional patches of sunlight on the ground. Marshes were encountered along the rivers. Many of them were, for practical purposes, impenetrable to man or beast and had to be by-passed. Jungles of all types were generally heavier in the valleys, thinned out on the ridges, and sometimes opened into areas of tall grass. Rainfall, which was relatively light during the earlier part of the campaign, became excessive after May 1. The Marauders seldom were completely dry thereafter until Myitkyina was taken. Contrary to expectations, they saw but few animals and occasionally a snake, but insects and leeches were a constant nuisance.

Mountains: The mountains constituted almost impassable obstacles. Men and animals were frequently injured when they fell down steep grades. Making a passable trail for animals meant grueling labor. Often it was necessary to dig trails in steep shoulders, and to cut steps to aid the animals in climbing. Men placed their shoulders to the rumps and bellies of the animals and pushed and heaved to help them take another step. The men were amazed at the agility of the mules, who were able to make their way where men had to use their hands to climb. In such terrain, it was essential that the work of the preliminary trail reconnaissance party be coördinated with that of the pioneer parties in order that trail improvement could be made ahead of the moving column.

Bivouacs: The Marauders habitually established their bivouac as a perimeter defensive position. While preparations for the night's bivouac were in progress, packers unloaded cargo and stacked it under cover. They then left the picket line, at which a guard remained, and put up their shelters for the night. Packsaddles were left on the animals during this period so that circulation would gradually return to the pressurized areas of their backs. The men then returned to the picket line, removed the packs, watered and fed the animals, and groomed them if darkness did not intervene. If circumstances prevented grooming at night, the animals were groomed the next morning. During this period the packmaster examined the animals and sent those requiring attention to the veterinary officer.

Lessons Learned

1. Troops who participate in jungle warfare must be in top physical condition. Otherwise, the hard physical work and the damp heat will soon wear the men to the point of exhaustion.

2. As it is conducted in the United States, training in animal management and the technique of pack transportation is sound. High animal losses during the Marauders' campaign were due, not to a lack of training doctrine, but to a lack of training and lack of time to condition animals.

3. Pack operations in the jungle are entirely feasible if:

a. Men and animals are in top physical condition.
b. Packers are thoroughly familiar with the technique of pack transportation and animal management.
c. Equipment is correctly adjusted to individual animals.
d. The unit which is being supported by pack transportation plans its operations with due consideration for the capabilities and limitations of its accompanying pack train.

4. Infantry units which employ pack transportation should train with pack animals. Unless this is done, the animals will not become properly conditioned nor will the troops become accustomed to including the animals in the scheme of operations. More than a few men should be experienced with animals. All men in charge of animals must be fully trained in their care and management, and indoctrinated with the necessity for giving them the best possible care under all conditions. Infantry officers in command of such units must have a thorough understanding of animal care.

5. The Phillips cargo saddle is too heavy, although it is excellent in all other respects. In rough terrain, breast collars are necessary and, where feasible, hangers should be provided for all standard loads so that the weight may easily be taken off the animal's back at short and indefinite halts.

6. Any change from hay to green forage should take place gradually to avoid diarrhea. Bamboo leaves are an excellent green forage.

7. Animals should be clipped prior to operations in hot climates. An adequate supply of pine tar should be kept on hand for treatment of open wounds and cuts, to prevent the entry of screwworms.

8. A combination of air supply and pack transportation is an excellent means of supplying rapidly moving troops. Packages of rations, medical supplies, and other items are of ideal size and weight to load on pack animals without further preparation.

Outguessing the Enemy*

by Captain W. H. Whyte, Jr.

In the fog of war, we seldom know enough about the enemy. We must not fool ourselves that we can guess what he will do, but stick to learning his "capabilities."

THE Japanese General, as he pored over maps in his Bougainville headquarters, was a very puzzled man. He was sure the Americans' next move would be a landing on Bougainville. The big question was where. In view of the tremendous stretch of vulnerable coast line this was quite an order for any G-2, but he was up to it. After a thorough study of terrain, hydrography and his past (and disastrous) experience with the Americans, he decided that the landing would undoubtedly be made at Gazelle Bay on the west coast.

His men feverishly prepared beach defenses and strengthened their Gazelle Bay garrison to meet this expected invasion. It is more than possible that one day an excited runner rushed into headquarters with an American officer's dispatch case which had been found in the bush along the coast southeast of Gazelle Bay. The Yankees had obviously been reconnoitering the area! As the writing in the officer's notebook was translated, we can imagine the "I told you so" smirks that came over the Japs' faces, for the American had stupidly jotted down his orders—orders to patrol the area to determine the best landing beaches.

But when the landing came, it was at Torokina, 15 miles to the north in an area lightly defended. However, the Jap commander was not this easily fooled—the Torokina landing was obviously a most clever diversionary move, so he kept his men at Gazelle Bay in readiness for the main landing.

As we know, it was never to come off, for, as had been planned all the time, the 1st Marine Amphibious Corps poured everything into Torokina. The captured notebook with the Gazelle Bay landing plan? It was prepared by the Marine G-2 and deliberately left behind by the amphibious patrol for the Japs to find. Actually, we cannot be sure that it was retrieved by the enemy, but we can be sure the Japs' belief that they had correctly divined our intentions cost them dearly.

Human nature being what it is, rare is the person who doesn't secretly feel himself endowed with a profound perception of other people, with instinctively correct hunches as to their probable behavior in a given set of circumstances. True, some of our predictions may have gone wrong, and we may have lost an election bet or two, but they were "exceptions." Thus, confronted with a rather foggy situation in which we, as platoon leader or division G-2, should make an estimate of the enemy, our natural instinct would be to avoid the routine job of objectively reviewing all our information and going to work with a map and a pair of dividers. It would be so much easier to put ourselves into the enemy's shoes to determine his probable intentions.

The Japs on Bougainville tried it and failed. In an even larger sense their fateful and now much-regretted decision to launch the Pearl Harbor attack was the result of paying too much attention to what the "decadent" Americans probably *would* do, and too little to what they *could* do. The German General Staff, if they get the opportunity to compile a manual of their mistakes in this war for future reference, might say "Amen" to this.

One might reply that the Germans and Japs, and often ourselves, simply made bad guesses—poor applications of a perfectly sound principle. What, then, is wrong with the theory of "intentions?"

In estimating intentions we're starting out on a line of deductive reasoning. On the basis of incomplete information we arrive at a premise—i.e., "The enemy always attacks over the worst terrain." Then we continue our deductive reasoning by applying this premise to individual cases; i.e., "Gongo Swamp is the worst terrain around; therefore the enemy will attack through Gongo Swamp." However, in deduction, our conclusion is valid only if the premise is absolutely correct. If it isn't we're liable to be in hot water.

Because we realize that in the fog of war we rarely know enough about the enemy to justify making sweeping generalities and premises that will hold true in all cases, we prefer the method of inductive reasoning, the method by which we let the facts point to the conclusions rather than taking a conclusion and finding facts to support it.

We go even further in admitting our shortcomings, for we know that in inductive reasoning the conclusions are only probable, the extent of probability depending

*Courtesy, *Marine Corps Gazette*, November, 1945.

on the amount of facts we have. Thus, in making our estimate of the enemy situation, we don't fool ourselves that we can determine what he will do, but more modestly stick to finding out which is the most probable of the things he *can* do. This is the system of "capabilities."

With what information we have of the enemy and the terrain, we consider what general courses of action he could physically carry out, however stupid or tactically unsound they might seem. Some of these courses wouldn't hurt us in the least, and might be just what we want him to do. While we are naturally curious about anything the enemy may be up to, first things come first, so we concentrate our attention on those of his courses which, if adopted, would interfere with the accomplishment of our mission, these being classed as his "capabilities."

As an example, let us take over the job of the S-2 of the battalion which has just arrived at 1400 in Buzu Woods, as shown in the drawing on this page. Our mission is to seize Mugo Ridge, currently occupied by what appears to be a company of unreconstructed Japs. H-hour has been set at 0800 tomorrow. What are the enemy's capabilities?

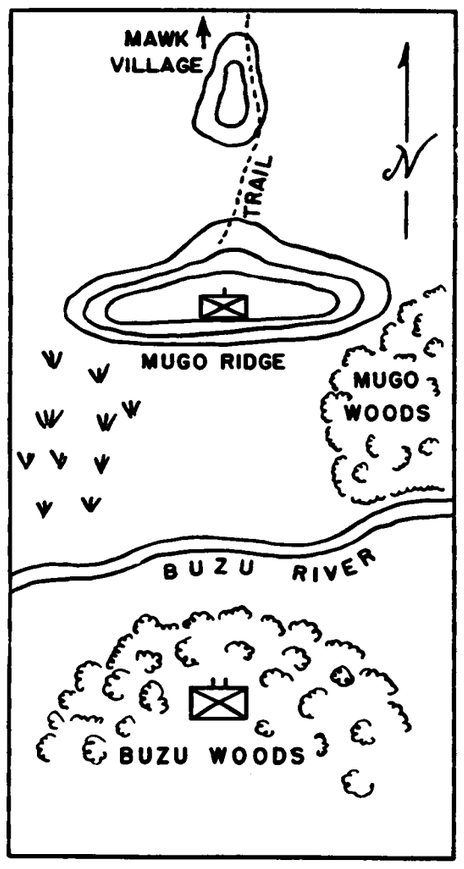
If he withdrew, we would be delighted. Such fortuitous action on his part would not hinder our job at all, so it is not a capability, although it would quickly become one if regiment told us to "destroy" that particular group of Japs. They can chiefly hinder our mission by defending the ridge. This is the obvious capability, and many would feel it the only one. But although they are not supposed to, since we are all set to attack, they *could* stage an attack of their own. Illogical as it might seem, it is a capability, just as was that of a German attack against our forces in the Ardennes sector last December.

If there were another company of Japs at Mawk Village to the north, we would add the capability of their reinforcing the unit now on Mugo Ridge. We would not qualify each capability according to a possible reinforcement build-up, for that would run into a regular geometric progression, but would state it as a separate capability common to the others.

So far we have examined the "what," but we must also consider the "where," and "when," and the "in what strength"—and this is where the trouble begins. The G-3, in making his time and space calculations for our own operations, includes reasonable allowances for all time-consuming factors such as the transmission of orders, reconnaissance and so on. Time and space calculations on the enemy, however, must be based on assumptions of complete preparedness, maximum speed and perfect operational efficiency. At the beginning of the war with Japan we tended to go a bit overboard on this and credited the Japs with being pocket-sized supermen, their transports of limitless capacity, and rough terrain their first love. We soon learned, however, that the Nip was no better with the machete than we. By the end of the war we could estimate rather closely the time and space factor of his capabilities. To overestimate the enemy, while perhaps not as dangerous as underestimating him, is to rob ourselves of many chances for quick and decisive action.

To get back to Mugo Ridge, let us continue the situation, keeping in mind the importance of determining the "where," "when," and "in what strength" factors. Our mission has now been changed to that of holding Buzu Woods—the Jap company at Mawk Village has finally marched south to reinforce the company already on Mugo Ridge. Continuous aerial reconnaissance has spotted no movement, and patrols in Mugo Woods were negative as of 1530. It is now 1700. What are the enemy capabilities?

Assuming that we have closely computed the rate of march through the swamp and jungle, we find that he can attack us with two companies on our front any time after dark; our right any time after 1900; our left any time after 2200; and our rear any time after 2400. Either a defense or withdrawal on his part in this instance would not be a capability, since it would not



What are the Japanese capabilities here?

interfere in any manner whatsoever with our mission.

But, you might say, is that all he could do? Could he not attack our left with a platoon, hit our front with another, and then envelop our right rear with the bulk of his force? Or couldn't he feint on our right with two platoons and launch his main attack straight across the river . . . or a feint on our left . . . and so on, ad infinitum?

Since the variations of the enemy's main capabilities are endless (not going beneath platoons in this instance, since there are over 200 "sub-capabilities") it is obvious that to go into the ramifications of each general course would be an impossible task. Accordingly, we concern ourselves chiefly with what the enemy will do with his *main body*.

Now let us take the same situation and examine it through the eyes of the one who believes in "outguessing" the enemy—of trying to determine his intentions. The battalion S-2, being a modest fellow, admits that while he knows what the Nips can do, he does not know what they *will* do in the next 24 hours. At the CP is Captain Hotshot, "an old Jap fighter," who has no doubts whatsoever that he can dope out what the enemy is up to by the simple process of placing himself in the enemy's shoes. "Easy, Lieutenant—so I'm over there on that ridge. I've got two companies. The Americans have a battalion. I've got a swell defensive set-up—good high ground—grazing fire to my front, as well as a river. There's a swamp protecting my right flank . . . I've got a swell route of withdrawal if things get too hot—couple of good spots for a delaying position between the ridge and Mawk Village. By defending I've got everything to gain and nothing to lose. If I attack a battalion with two companies, I'm crazy. And let me tell you something, Lieutenant, I know these Nips pretty well, and they're not crazy. Take it from me, those babies are going to sit on that ridge."

Captain Hotshot, rather pleased at this searching analysis of the situation, is temporarily discomfited by the sudden appearance of Sergeant Jones, just back from patrolling Mugo Woods. The sergeant's patrol had run into a group of Japs hacking a large trail up to the banks of Buzu River. By cross-examination, however, Captain Hotshot finds that the Japs were jabbering away merrily when the patrol spotted them! "Simple! Plain as the nose on your face—they were staging a demonstration to make us think an attack is coming up—the fact that they were making so much noise gives 'em dead away." Here Captain Hotshot permits himself a patronizing chuckle. "Well, that might fool some people, but they'not not fooling this bird. I know what makes these Nips tick."

Fortunately, since this is a hypothetical case, we can actually find out what is going on over there on Mugo Ridge. For one thing, Captain Ichimura, a first class officer, was killed this afternoon by a mortar shell, and the company commander of the outfit, just arrived from Mawk Village, is 1st Lieutenant Sugiyama, a fireball of limited intelligence. Yesterday afternoon he was severely reprimanded by the battalion commander for his company's being the worst in the battalion, so Sugiyama is naturally anxious to redeem his good name as well as the company's. On the basis of reports from patrols and observation posts, he estimates the strength of the Americans on the other side of the river to be approximately a reinforced company. It does not give him much margin of superiority, but as he is an unusually skillful tactician, and as one Jap is worth 10 Yankees, he knows he can annihilate them. Accordingly, he has sent out a trail-blazing patrol to prepare the way for a forced night march to turn the enemy's right flank after which one good banzai charge will do the trick.

Far fetched?

Delve into the background of any Japanese campaign in the past war and you will find that they, like ourselves, often made plans on the basis of inaccurate information, improper evalution, poor terrain analyses, and these plans, good or bad, were changed at the very last minute. So how in the world, with even the best of information, can we tell what the enemy is going to do when frequently he does not even know himself?

At the battle of Frederickburg, Lee was about to deliver on Burnside's badly disposed Union forces an attack which gave every promise of success. Just then he was given an order of Burnside's that had been captured—an order which revealed Burnside was planning to attack the next morning. Stonewall Jackson was all for attacking immediately, but Lee decided, on the basis of this document, to postpone the attack and lay a trap that would catch Burnside when he ventured forth the next morning. As luck would have it, Burnside changed his mind and withdrew, thus robbing Lee of what perhaps had been his best opportunity to destroy the main Union army.

Lee, of course, was taking a justifiable military gamble in postponing his attack, but it is an illustration of how impossible it is, even under the best of circumstances—such as the capture of the enemy's plan—to determine ahead of time exactly what the enemy *will* do.

In this connection we should avoid deducing the enemy's mission, for it is simply another way of estimating "intentions." The Japs, having "G-2d" the marines' Bougainville beaches with a conspicuous lack of success, apparently still believed themselves up to reading our minds, for they decided that the U. S. mission was to conquer the entire island. Thus, while the marine beachhead was being consolidated, they refrained from attacking it with any sizable force, but rather strengthened the defenses of the island's various garrisons. When it later became evident that the marine mission had been to establish a perimeter to defend newly constructed airfields, the Japs mounted a full scale attack, but too late to have any real chance of success against the perimeter, now well dug in.

Obviously no commander is greatly helped in making a decision by a mere list of what the enemy *can* do. In calculating his best course the commander wants to know what is the most probable enemy capability. In determining this priority, the primary consideration is the disposition of the enemy forces—which course is he best located to carry out? In the case of the Japs on Mugo Ridge, if our reconnaissance indicated that the bulk of the force had moved to Mugo Woods during the night, we would be justified in listing an attack on our right as the most probable. True, it might be a feint, but if we get too subtle about it we could never determine anything.

The biggest pitfall in estimating probability is to analyze the terrain to determine which course it favors most. The fallacy of this reasoning lies in the fact that the enemy, in making his dispositions, has *already* made his terrain analysis. Our terrain analysis might be better, but he is placing his troops on the basis of *his* evaluation, not *ours*. That is the reason why, in estimating the probable order of the capabilities, we are guided primarily by the enemy's dispositions rather than by the terrain.

Dispositions are the basic consideration in estimating priority of capabilities, but there are 4 other factors that can influence our choice of the most probable enemy course. These are: the enemy's tactical doctrine, his recent performances, national psychology, and the character of the hostile commander.

Among the armies of the world, Field Service Regulations vary little, lip service being paid to all of the standard tactical principles. Past enemy performances, however, reveal which of these principles the enemy customarily puts most emphasis on, and which of them he honors in the breach. In respect to the Japs we found that despite their Staff Manual's warnings against uncoördinated offenses, piecemeal attacks were the rule rather than the exception.

The national psychology of the enemy nation frequently may point to an indication of priority. Intelligence officers early learned that they could often expect a full-blown banzai charge on the anniversary of the Emperor, Meiji, even when the situation called for considerable Nip circumspection.

In like manner our intelligence agencies must constantly be striving to learn as much as possible of the character of the officers of the armies of the world. The obscure second lieutenant of today may be the general opposing us tomorrow. Is he rash? Is he cautious? Does he love a good party . . . liquor? Patient detail work now may provide one of our future commanders with character analyses that will help him keep one jump ahead of the enemy. George Washington, one of the most intelligence-minded of all our military leaders, was always anxious to find out as much as possible of the character of his opponents. His awareness of Lord Howe's dilatory ways enabled him to escape defeat more than once when they met in the field. In using these 5 factors affecting the priority of enemy capabilities, the big temptation is to slight dispositions, develop a "pet theory" as to what the enemy *will* do, and then rationalize it on the basis of tactical doctrine, psychology and so on. This form of reasoning becomes, in effect, that of "intentions." We must remember that the basic consideration in determining the most probable capability is the known disposition of the enemy; in other words, which course is he best disposed to carry out?

To sum up: on the basis of the last known enemy situation we consider all those courses of action of which he is physically capable, examine them in the light of our mission, and class those which would interfere with our mission as capabilities.

In stating these capabilities we determine as closely as possible the time, the space and strength factors—when (usually the earliest time) he can carry out his course—where—and in what strength.

While we give the enemy the benefit of the doubt to avoid being surprised, we nevertheless use all the information and background material we have available to narrow down the time, space, and strength factors so that we will not overestimate him and thus lose many opportunities for success.

Whenever possible, usually on the basis of the enemy's dispositions, we determine his most probable capability. However, we avoid at all costs becoming so engrossed with this that we forget other courses of which he is still quite capable.

The atom bomb, the new complexion of warfare, may make our time and space charts of today soon useless, but they reinforce the importance of the doctrine of capabilities. Let us lull ourselves into believing we know what potential antagonists will do (often synonymous with what we want them to do), and we may be awakened by a triple-atom, jet-propelled, television-controlled, Buck Rogers device that was not on our list of capabilities.

Once you feel sure that you *know* what the colonel sitting across the river from you is going to do tomorrow morning, just remember that if you are a normal human being you have sold yourself a bill of goods. From that point on, unless you have an extraordinarily well disciplined mind, it is going to be easy for you to find material to support your conviction. Recall our political campaigns—how one orator can take a set of facts and prove to his and others' complete satisfaction that Candidate X is a veritable devil, while another orator, with exactly the same set of facts, can by different emphasis, selection and interpretation prove that, quite to the contrary, Candidate X is a saint.

With the system of capabilities we are not out to *prove* anything. We follow it to guard against snap judgments, preconceived opinions, overconfidence in our powers of foresight—and with it to keep our minds completely open.

21st British Army Group in Europe, 1944-45*

PART I

The following article is a lecture given by Field Marshal Sir Bernard L. Montgomery to the Royal United Service Institution, and gives a comprehensive story of the part played by the 21st British Army Group in a major campaign. As its commander, Field Marshal Montgomery tells of the problems and how they were solved as well as the strategy behind the over-all military plan. This story will be concluded in Part II in the next issue of The Cavalry Journal.

by Field Marshal Sir Bernard L. Montgomery, G.C.B., D.S.O.

IT is essential to begin by saying that in modern war every operation is combined; no single service completely predominates all the time. In the initial stages of this campaign the object was to secure a lodgment on the Continent from which further offensive operations could be developed; this was clearly a combined operation of the first magnitude.

Before the operation was launched it was the task of the air forces to create conditions favorable to a successful landing and to the subsequent development of operations inland. Both the army and the navy relied on this being done, and it was done; the heavy bombers of Bomber Command and of the American Air Force did magnificent work in weakening Germany generally, and in particular in destroying the enemy railway system, which enormously reduced the mobility of the enemy once operations began.

Until the army stepped ashore it was completely in the hands of the navy and air forces for its sea and airborne landings.

Once the army was on shore all military operations became combined army/air operations; the mighty weapon of air power enabled the army to conduct its operations successfully and with far fewer casualties than would otherwise have been the case. The army relied on the navy and on the air forces for secure communications across the sea from our island base in Britain.

As a soldier I would like to say that the army owes a great debt of gratitude to the navy and the air force and realizes fully its complete dependence on them in all military operations. I feel certain that sailors and airmen will agree that the contribution of the army to the successful conclusion of the German war was up to standard.

This campaign involved the whole problem of the conduct of offensive operations on land in Western Europe with the final object of destroying the enemy's armed forces and occupying Germany. The army had got to carry out this task; it is obvious that no other service could do it.

Therefore the first need was to decide how the operations on land were to be developed so that the object could be attained in the simplest and quickest way. It was then for the navy to say whether the army could be put on shore in such a way that the land battles could be developed in the required manner; and it was for the air force to say whether this would suit the air plan. And so the combined plan was built up; some compromise was necessary and this will always be the case; but eventually, and very quickly, an agreed plan emerged.

Before passing on to describe the plan and the opera-

*The Journal, Royal United Service Institution.

tions, I must pay tribute to the splendid teamwork that was built up by the Allies in this campaign. Under the Supreme Commander, General Eisenhower, the various components of the great force involved were welded into a fine fighting machine. "Allied Solidarity" was the keynote of our policy, and it was achieved in no uncertain manner.

From now on I shall confine myself to the purely military side of the campaign, and I should like to remind you that in relating the action of the soldiers, I speak not only of the American, British and Canadian forces, but also of the contingents of Belgians, French, Dutch, Poles, Czechs and other Nationals which were included in the 21st Army Group, all of whom played their part with distinction.

The Plan

The intention was to assault, simultaneously, beaches on the Normandy coast immediately north of the Carentan estuary and between the Carentan estuary and the River Orne, with the object of securing as a base for further operations a lodgment area which was to include airfield sites and the port of Cherbourg. The left or eastern flank of the lodgment area was to include the road center of Caen.

General Eisenhower had placed me in command of all the land forces, British and American; I was in fact his land force commander.

Once ashore and firmly established, my plan was to threaten to break out on the eastern flank—that is in the Caen sector; by this threat to draw the main enemy reserves into that sector, to fight them there and keep them there, using the British and Canadian armies for the purpose. Having got the main enemy reserves committed on the *eastern* flank, my plan was to make the break-out on the *western* flank, using for this task the American armies under General Bradley, and pivoting on Caen; this attack was to be delivered southward down to the Loire and then to proceed eastward in a wide sweep up to the Seine about Paris. This would cut off all the enemy forces south of the Seine, over which river the bridges were to be destroyed by air action. The general plan was given out by me to the General Officers of the field armies in London in March, 1944—that is, three months before D Day. The operations developed in June, July and August exactly as planned. I had given D + 90 as a target date for being lined up on the Seine; actually the first crossing of the river was made on D + 75.

Why did we select the Normandy beaches? They offered a better shelter for shipping and were less heavily defended than other possible beach areas along the Channel coast. They satisfied the minimum requirements of the air forces, in terms of their distance from home bases, for the provision of air cover. The absence of major ports was overcome by the gigantic engineering feat of constructing two artificial ports in the United Kingdom which were towed across the Channel in sections and erected, one in the United States sector and one in the British sector. In spite of considerable damage during the unprecedented June gale, the port at Arromanches in particular proved a great success.

The invasion operations may be said to have begun with the action of the air forces. The first stage was the winning of the air battle, an essential preliminary always to all major offensive operations. This task was admirably accomplished. As D Day drew nearer, attacks were delivered against coast defenses along the whole length of the Atlantic Wall. Meanwhile, prevention of enemy air reconnaissance during the period of concentration of the invasion forces was highly successful, and contributed towards the gaining of tactical surprise. Naval operations were intensified against E-boats and U-boats as the great day approached.

The Assault

My plan of assault, as approved by the Supreme Commander, provided for simultaneous landings by 8 equivalent brigades—of which three were British and two were Canadian brigades, and three were American combat teams. With the assaulting brigades, two battalions of U. S. Rangers and portions of two British commando brigades took part. The Americans assaulted on the right flank as they would ultimately require direct entry of personnel and stores from the Atlantic.

Airborne forces were used on both flanks. On the right, the 82nd and 101st U. S. Airborne Divisions dropped at the base of the Cotentin peninsula to assist in capturing the beaches and isolating Cherbourg. The 6th British Airborne Division was given the task of seizing the crossings over the Caen Canal and of operating on our extreme left.

The first task of General Bradley's forces was to cut off the Cotentin peninsula and seize Cherbourg. Operations would then develop southward. The British forces, under General Dempsey, were to make straight for Caen to establish the pivot.

It is important to mention the subject of build-up. I considered it essential for the success of initial operations to have ashore and ready for action by the end of D + 3, 7 divisions together with the necessary proportion of armor, quite apart from the airborne troops. With these forces I was confident of being able to defeat the first German attempts to dislodge our forces and also of being able to retain the initiative.

The Battle of Normandy

The assault on the beaches of Normandy began on June 6, 1944. Airborne forces were dropped first; then from a mighty armada of ships and craft, preceded by a tremendous weight of bombing from the air, American, British and Canadian troops set foot again in France.

Despite the enemy's plan to defeat us on the beaches, there were no surprises awaiting us, and our measures for overcoming the formidable array of obstacles and beach defenses were effective. The secrecy of our operations, and the special measures taken to mislead the enemy, had achieved a great measure of tactical surprise—and in the circumstances we could not hope for more. Moreover, our losses were lighter than we had expected.

Within a week the beachheads had successfully linked up, and along the continuous front Allied troops were engaged in heavy fighting in the difficult *bocage* country. Adequate stocks of ammunition and supplies had been accumulated, and our build-up was proceeding well. We had gained a strong foothold; we had suffered no setbacks; we had maintained the initiative.

Having first isolated the enemy forces covering Cherbourg by a thrust across the base of the Cotentin peninsula through St. Sauveur, the Americans turned north to deal with Cherbourg. The port was captured on June 26.

Meanwhile, the Second British Army was continuously engaged in fierce fighting round Caen, where the bulk of the enemy armor was committed. By the end of June there were 6 Panzer divisions involved on our eastern flank with a further Panzer division expected.

The Break-Out

In early July, the First U. S. Army was gaining position for the break-out from the initial lodgment area. Operations centered in the La Haye du Puits sector and in the capture of St. Lô. Meanwhile, the business of locking up the enemy armor on the eastern flank continued.

Preceded by a highly successful bomber raid, when for the first time aircraft of Bomber Command operated on the tactical battlefield, we entered Caen on July 9. In order to increase the enemy's anxiety in this sector by threatening armored action in the open country southeast of Caen, I now withdrew three armored divisions into reserve. The enemy responded suitably; the bulk of his armor remained where we wanted it.

The Second British Army now extended its front farther west in the Caumont sector in order to increase the striking force available to the First U. S. Army. The First Canadian Army (under General Crerar) took over responsibility for the extreme left sector on July 23. The stage was thus set for the break-out from the western flank.

On July 25 the main American attack started in the sector between Periers and St. Lô. The Eighth U. S. Air Force was employed in the tactical rôle and dropped a carpet of bombs immediately in front of the leading troops as a preliminary to their advance. The advance was highly successful; Avranches was taken on July 30. The VIII U. S. Corps, under command of Headquarters Third U. S. Army (General Patton), was then directed into the Brittany peninsula. With the entry into the field of the Third U. S. Army, Headquarters Twelfth U. S. Army Group (General Omar Bradley) assumed command of both American armies. The Twelfth U. S. Army Group remained under my operational control.

The enemy was trying to recover his balance as the powerful American attack pushed back his left flank and began to swing southeast and east. He tried to stabilize a front on "hinges" at Caumont, on the Orne, and on the high ground between Caen and Falaise. One by one the hinges, or "key rivets," were successively knocked out by the British armies working from west to east as the attack of the American armies on the west flank gathered momentum.

By August 6 the area Laval-Mayenne-Domfront had been reached and on the following day the First Canadian Army, which had now extended its front to include the Caen sector, began a series of major attacks astride the Caen-Falaise road.

This was an exciting time, as it was now to become apparent whether the enemy would stand and be defeated between the Seine and the Loire or whether he would endeavor to withdraw his forces behind the Seine. Between August 7 and 11 it became clear that he had decided to fight the Battle of France on our side of the Seine. On the 7th a major counterattack employing up to 6 armored divisions was launched on Hitler's orders against the American forces in the area of Mortain. It was designed to cut off the forces operating south of Avranches by a drive to the sea. In the face of this counterattack the Americans, assisted by the full weight of the tactical air forces, stood firm.

I ordered the right flank of the Twelfth U. S. Army Group to swing north towards Argentan, and intensified the British and Canadian thrusts southward to the capture of Falaise. It had become a race to trap the German forces deployed in the long salient between Falaise and Mortain. Meanwhile, the enemy received a tremendous hammering from the air.

Falaise fell to the Canadian Army on August 16; American forces had reached Argentan, and fighting of tremendous intensity was in progress at the bottleneck with the German striving all he knew to force his way out.

Speedy regrouping of the Twelfth U. S. Army Group front, combined with outstanding administrative improvisation, enabled the advance eastward of the Third U. S. Army to continue *while the battle of the Falaise pocket was still in progress*. By August 20, troops of General Patton's army reached and crossed the Seine in the area of Mantes and began to work westward along the river towards Elbeuf. While American, Canadian, French and Polish troops held the neck of the bottle, the Second British Army and First U. S. Army, strongly supported by the tactical air forces, overran and eliminated the trapped enemy. The other armies of the 21st Army Group then began the race to the Seine. They quickly reached their sectors on the river; tremendous execution was done by the air forces, particularly at the Rouen ferries.

After the Battle of Normandy

Here I will pause for a moment to discuss the enemy situation as a result of the Battle of Normandy. The

losses sustained by the Germans were truly tremendous. Of his Army, Corps and Divisional commanders, 20 had been killed or captured and two others wounded. The supreme German commander had been changed twice. Of his fighting troops, 43 divisions had either been eliminated or very severely mauled, apart from those locked up in Brittany and the Channel Islands. His losses in killed, wounded and prisoners were not far short of half a million men. His material losses were equally severe; some 1,500 tanks were destroyed and 3,500 guns were either destroyed or captured.

The Battle of Normandy had conformed to the pattern decided upon before D Day. There was nothing the enemy had been able to do which ever upset this plan, and there was never a moment in which we had not firmly held the initiative. The massive counterattack which we had always taken into consideration in our plans before the invasion never materialized in the earlier stages. He had been forced to use his Panzer formations to plug holes in the line in response to our thrusts. He was not able to launch a main stroke with them until after we had broken out of our original bridgehead. It was then too late.

The Drive to Antwerp

On September 1 the Supreme Commander assumed command and direction of the Army Groups himself, and I was no longer, therefore, his over-all land force commander. From now on my story will be primarily concerned with the 21st Army Group proper, that is, with the British and Canadian forces, together with the various Allied contingents which served with them.

In considering the development of the strategic plan after crossing the Seine the primary object, of course, was the destruction of the German Army. As a result of discussions between the Supreme Commander and myself, from now on the eventual mission of the 21st Army Group became the isolation of the Ruhr. The urgent problem was to prevent the enemy's recovery from the disaster sustained in Normandy. A major consideration was the administrative situation created by our ever-lengthening lines of communication. My administrative staff had, however, been building up reserves during August in order to support the pursuit. Imports were cut by 60 per cent in order to release a considerable quantity of transport from beach and port clearance for forward maintenance purposes.

The immediate tasks of the 21st Army Group were:—

(*a*) the destruction of the enemy in northeast France,
(*b*) the clearance of the Pas-de-Calais with its V-bomb sites,
(*c*) the capture of airfields in Belgium, and
(*d*) the capture of Antwerp.

Between August 25 and 30 the Second British Army and First Canadian Army crossed the Seine, in most cases without serious opposition. The 4 Allied armies now started advances which were eventually to bring them to the Rhine on a very broad front.

On the right of the Third U. S. Army, having concentrated east of Paris (which was liberated on August 25), was striking eastward during the first week of September to Nancy and Verdun. Shortly afterwards another column was directed southeast toward the Belfort area to join up with the Seventh U. S. Army approaching from Marseilles.

The First U. S. Army advanced over the Aisne with its right flank directed on the Duchy of Luxembourg and its left flank on the general axis Mons-Liége.

The second British Army advanced northeast on Central Belgium, while the First Canadian Army was about to sweep up the Channel coast.

The 30th Corps was the spearhead of the British drive to the north. Amiens was reached on August 31, Brussels was entered on September 3, and the city of Antwerp on the following day. This advance imposed a considerable strain on administration. We were maintaining our spearhead some 400 miles from the temporary base in Normandy. The greatest strain was thrown on road transport, because only short stretches of railway were available owing to the widespread demolitions. But all difficulties were overcome, and the pace of the pursuit was maintained.

Decision to Seize a Bridgehead

The speed of our advance through the Pas-de-Calais and into Belgium convinced me that if the Allies could concentrate and maintain sufficient strength for the task, one powerful and full-blooded thrust deep into Germany would overwhelm the enemy and carry with it decisive results. The best axis along which such a thrust could have been developed was the route north of the Ruhr leading to the plains of Northern Germany. It was obvious that the enemy would concentrate strong forces to defend this vital axis, and the industrial area of the Ruhr.

Speed was essential. The stroke could be effective only if carried out at once, taking advantage of the disorganized state of the enemy; moreover, weather conditions would inevitably deteriorate from mid-September onward and handicap the use of our air power and our airborne forces. But we would have to be strong enough on the selected axis to get decisive results quickly.

Could sufficient troops be made available, and could our maintenance resources sustain them on such long lines of communication? If so, the end of the was in sight.

The Supreme Commander came to the decision that we should not at this stage stick out our neck in one single thrust deep into enemy territory, owing to our lack of major deepwater ports. The lines of communication still stretched to the Normandy beaches and Cherbourg peninsula, and the Autumn weather was close upon us. He therefore decided that the early opening up of deepwater ports and the improvement of our maintenance facilities were prerequisites to the final assault on Germany proper. He directed that our immediate aim should be the establishment of bridges over the Rhine throughout its entire length, and that we should not go beyond this until Antwerp or Rotterdam could be opened. In view of the time factor it was agreed that the 21st Army Group should launch its thrust to the Rhine before completing the clearance of the Scheldt estuary.

I ordered the resumption of the Second Army advance from the Antwerp-Brussels area for September 6, and by September 11 a bridgehead was established over the Meuse-Escaut Canal. It was already noticeable that the enemy was beginning to recover his balance, so that the urgency of launching the thrust to the Rhine was underlined.

On Sunday, September 17, the Battle of Arnhem began. The purpose was to cross the Meuse and the Rhine and place the Second Army in a suitable position for the subsequent development of operations toward the northern face of the Ruhr and the North German plains. The thrust to Arnhem outflanked the northern extension of the West Wall, and came very near to complete success.

The essential feature of the plan was the laying of a carpet of airborne troops across the waterways from the Meuse-Escaut Canal to the Neder Rijn, on the general axis of the road through Eindhoven to Uden, Grave, Nijmegen and Arnhem. The airborne carpet and bridgehead forces were provided by two American and one British airborne divisions and a Polish parachute brigade. Along the corridor, or airborne carpet, the 30th British Corps was to advance and establish itself north of the Neder Rijn with bridgeheads over the Ijssel facing east. From the start, however, adverse weather conditions prevailed, and indeed, during the 8 vital days of the battle, there were only two on which the weather permitted even a reasonable scale of offensive air support and air transportation. As a result, the airborne formations were not completed to strength (indeed, the 82nd Airborne Division was without a complete glider-borne combat team). It had moreover been the intention to fly in the 52nd Division, but this project had to be abandoned. Re-supply missions were repeatedly cancelled, and when flown were often on a greatly reduced scale. Had reasonable weather conditions obtained, I believe that the Arnhem bridgehead would have been established and maintained.

Full success at Arnhem was denied us for two reasons. First, the weather prevented the building up of adequate forces in the vital area. Second, the enemy managed to effect a very rapid concentration of forces to oppose us, and particularly against the bridgehead over the Neder Rijn. In face of this resistance the British group of armies in the north was not strong enough to retrieve the situation created by the weather by intensifying the speed of operations on the ground.

We had not the divisions to widen the corridor sufficiently quickly to reinforce Arnhem by road.

On September 25 I ordered withdrawal of the gallant Arnhem bridgehead. We retained the vital crossings at Grave and Nijmegen, and their importance was to be amply demonstrated.

On the central sector of the Allied front, by the middle of September, the First and Third U. S. Armies were fighting on the Siegfried Line from the Aachen area through the Ardennes to the region of Trier and southward along the general line of the upper Moselle. By the third week in September the Sixth U. S. Army Group which had landed at Marseilles was firmly deployed on the right of the Twelfth U. S. Army Group and the Allied front was continuous to Switzerland.

We had moved eastward toward the Rhine on a broad front, but had been halted. We had gained great successes, but had been nowhere strong enough to gain decisive results quickly.

Operations to Open Up Antwerp

The enemy had achieved a measure of recovery. This was clear not only in the Arnhem operation, but also in his reaction to American thrusts in the Siegfried Line. We had to prepare for a hard killing match before we could secure the Ruhr and advance into Germany. We had also to open the approaches to Antwerp before winter set in. The immediate intention therefore became the clearance of the Scheldt estuary.

This task was given to the First Canadian Army and lasted through October to the first week in November. The enemy resistance was vigorous, and some very hard fighting took place, leading up to the final operation for the capture of Walcheren. The reduction of this fortress presented many novel problems. These were overcome principally by very remarkable precision bombing by Bomber Command, which breached the dykes and submerged large areas of the island. The extensive use of special amphibious devices enabled our troops to operate in the resulting floods. The naval craft put up a very fine performance in this battle in spite of severe casualties from the coast defenses and the rough seas.

Preparations for Entering the Rhineland

As the Antwerp operations were progressing, I was busy considering regrouping for the next major battle which would precede the capture of the Ruhr. I had hoped to launch an offensive some time in the late autumn to clear the area between the Meuse and the Rhine, but it was necessary first to clean up the considerable enemy forces which remained west of the Meuse, particularly in the Venlo area. We were not strong enough to do this and at the same time undertake a major thrust between the rivers.

This phase I call "the preparations for the battle of the Rhineland"—I refer here, and throughout, to that part of the Rhineland falling in the 21st Army Group

zone. These operations enabled us to economize forces by basing the front on the Meuse obstacle, and insured a friendly western flank for the battle to follow. The weather was often appalling, and the fighting took place in difficult country against a very tenacious enemy. But by early December the Second British Army was lined up along the River Meuse as far south as Maeseyck, whence the front crossed the river to the area Geilenkirchen and joined the Ninth U. S. Army.

To facilitate the Second Army operations, I transferred the responsibility for the Nijmegen bridgehead to the Canadian Army on completion of the Scheldt operations. The regrouping had a further object; the First Canadian Army was required to plan the battle of the Rhineland which was to be launched from the Nijmegen area; the Second British Army was to plan the subsequent assault across the Rhine.

While these plans were maturing, the enemy, too, was busy. The severe attrition he had exeperienced during the past two months had not prevented the re-equipment of his strategic reserve. The Sixth S.S. Panzer Army was ready for battle.

Plans for regrouping of the 21st Army Group for the battle of the Rhineland were completed by early December. We had reached the stage when some divisions were actually on the move to their new concentration areas when, on December 16, the German counter-offensive in the Ardennes broke. Our plans were postponed.

The Battle of the Ardennes

The full weight of the German counteroffensive in the Ardennes was not immediately apparent. Extremely bad weather had precluded satisfactory air reconnaissance, and the German concentration had been carried out with a high degree of secrecy. However, on the 18th I was considering the possible effects of a major enemy thrust toward Brussels and Antwerp on our dispositions—for the Army Group was at that time transferring the bulk of its weight to the extreme northern flank. I ordered the concentration for the Rhineland battle to stop, and had plans prepared for switching some divisions from the Geilenkirchen sector to the west of the Meuse.

By the 19th the full implications of the German attack were established. It was known that the Sixth S.S. Panzer Army was thrusting in a northwestern direction towards Liége, with the Fifth Panzer Army in a wider wheel on its left. The Seventh German Army was in support. On the same day the Supreme Commander entrusted to me temporary command of the First and Ninth U. S. Armies (with effect from the 20th), as they were at that time on the northern side of the German salient and therefore remote from the Twelfth U. S. Army Group axis.

On the 19th I ordered General Dempsey to move the 30th Corps west of the Meuse to a general line from Liége to Louvan, with patrols forward along the western back of the river between Liége itself and Dinant. This Corps was thus suitably placed to prevent the enemy crossing the river, and could cover the routes from the southeast leading into Brussels. It subsequently became necessary in connection with the regrouping of the American First Army to send some British divisions east of the Meuse. But throughout the battle I was anxious to avoid committing British forces more than was necessary. Had they become involved in large numbers, an acute administrative problem would have resulted from their lines of communication crossing the axis of the two American armies. Moreover, it was foremost in my mind that as soon as we had defeated the German attack we should return to the business of the Rhineland battle as quickly as possible.

The Battle of the Ardennes was won primarily by the staunch fighting qualities of the American soldier, and the enemy's subsequent confusion was completed by the intense air action which became possible as weather conditions improved. The Sixth S.S. Panzer Army broke itself against the northern shoulder of the salient while the Fifth Panzer Army spent its drive in the fierce battles which centered on Bastogne. Regrouping of the First and Ninth U. S. Armies, assisted by British formations, made possible the rapid formation of a reserve corps of 4 U. S. divisions under General Collins. The action of this corps, coördinated with the drive from the south by General Patton's Third U. S. Army, pinched the enemy forces out of the salient and began the bitter struggle which was to push them out of the Siegfried Line.

The enemy had been prevented from crossing the Meuse in the nick of time. A detailed study of the battle would show how rapid regrouping enabled the Allies to regain the initiative which the enemy had temporarily seized. Once we were sure of the Meuse crossings it became increasingly apparent that the opportunity had come to turn the enemy's position to our advantage. Hitler's projected counteroffensive ended in a tactical defeat, and the Germans received a tremendous battering. As soon as the situation had been restored I was able to order the British divisions north again to the concentration areas which had been made ready in December.

The Battle of the Rhineland

The main objective of the Allies on the Western Front remained the Ruhr. Once the Ruhr had been isolated from the rest of Germany, the enemy's capacity to continue the struggle would quickly peter out. Beyond this, the object of our operations was to force mobile war on the enemy by developing operations into the northern plains of Germany. We were therefore required to line up on the Rhine; then to bridge the river and gain a suitable jumping off position for a mobile campaign in the spring. The enemy was in a very bad way; he had suffered another major defeat with heavy losses in men and equipment. Moreover, the great

Russian winter offensive was now under way, and we did not wish to give the enemy the chance to switch forces to the east.

The Supreme Commander's orders to the 21st Army Group provided for a line-up on the Rhine from Düsseldorf northward. The Ninth U. S. Army remained under my operational control.

First we had to eliminate the enemy salient west of the River Roer between Julich and Roermond. The Second Army completed this task by January 28. The divisions concerned, less defensive troops left holding the river line, immediately started north to join the concentration for the Rhineland battle. In studying the plan for this battle you should notice how the grouping of the armies was related to their subsequent tasks. I have already mentioned the transfer of the Nijmegen bridgehead to the First Canadian Army, which was to be responsible for the northern thrust.

The Battle of the Rhineland was based on two converging offensives between the Rhine and the Meuse with the object of destroying the enemy forces masking the Ruhr. It was intended, by interdiction from the air and by employing the maximum available forces on the ground, to prevent the enemy withdrawing to the east bank of the Rhine. In this we were largely successful.

The First Canadian Army was ordered to launch an attack southeast from the area of the Nijmegen bridgehead to meet the Ninth U. S. Army, whose thrust was developed from the Julich-Roermond sector northward. It was originally planned to launch the two operations almost simultaneously, but the southern thrust was delayed. In the event this proved to our advantage.

The date by which the Ninth U. S. Army could attack was dependent on the rate at which U. S. divisions could be released from other sectors of the Allied front, as the strength of that Army was to be increased to 12 divisions. Release of these divisions depended on the situation on the rest of the front. The Twelfth U. S. Army Group was still involved in the Ardennes, particularly in thrusting toward the system of dams on the River Roer which control its flood waters. As long as the enemy held these dams he was in a position to impose flood conditions likely to impede the crossing of the river. Farther south, the heaviest fighting was in the Saar and in the Colmar pocket—in both areas the enemy had achieved local successes. The weather remained an anxious uncertainty. The thaw was beginning and, apart from the floods, it was playing havoc with our road communications.

The concentration of divisions for the Canadian Army attack was completed in the first week of February. Elaborate arrangements were made to assemble the forces employed into the very confined concentration areas, and also to mislead the enemy about our intentions.

On February 8 the northern wing of the pincer movement started. The 30th Corps, under command of the First Canadian Army, launched its attack into the Reichswald Forest and the northern extension of the West Wall on a front of 5 divisions, supported by very considerable air forces and over 1,000 guns. This began the memorable battle which, in intensity and fierceness, equalled any which our troops have experienced in this war. The Germans quickly built up to about 11 equivalent divisions, including 4 parachute divisions and two armored divisions. In particular their paratroops fought magnificently.

Meanwhile the situation was improving in other parts of the Allied front. Operations in the Colmar area had been successfully concluded and the Germans thrown back across the Rhine at the southern extremity of the Allied front; the Saar sector had been stabilized. More important still, the Sixth S.S. Panzer Army was transferred to the eastern front to oppose the mounting Russian offensive. The concentration of American divisions into the Ninth U. S. Army was achieved remarkably quickly, over long distances, using shocking roads and tracks, and in appalling weather.

The launching of the American thrust had been planned to start between February 10 and 15 but at the last minute, before abandoning the Roer dams, the enemy carried out demolitions which loosed the flood waters. There followed an anxious period of waiting, with all the troops teed up for the battle, while the water subsided sufficiently to enable the crossing to be launched. On February 23 the Ninth U. S. Army, under command of General Simpson, commenced its attack north toward the area where the First Canadian Army was fighting a most intense battle. Owing to the delay in starting the southern thrust, the Reichswald battle had drawn enemy strength from the Ninth U. S. Army sector. The Americans took every advantage of this opportunity and advanced with admirable speed; their action in its turn eased the pressure in the north.

As the Ninth U. S. Army swung north, the First U. S. Army was made responsible by the Supreme Commander for the security of its southern flank; the thrusts toward Cologne were thus related directly to our operations.

The keynotes of the Battle of the Rhineland were the intense and fanatical opposition of the enemy who, as we had hoped, accepted battle west of the Rhine, and secondly the appalling weather conditions. The northern flank of the Reichswald operations was conducted mainly in various types of amphibious vehicles; in general, the mud and slush were indescribable and greatly hampered the movement of troops and supplies through the heavily wooded areas which are so lacking in roads.

On March 3 the two armies linked up, but it was not until the 10th that the enemy bridgehead covering Wesel was liquidated. The 21st Army Group was now lined up on the Rhine as far south as Düsseldorf.

The enemy had suffered yet another heavy defeat. He had lost nearly 100,000 men in killed, wounded and prisoners. Eighteen divisions and a large number of

hastily formed units had been battered. The end of the war could now only be a matter of weeks. Once more the essential factor was speed.

Meanwhile, on March 7-8, farther to the south, the First U. S. Army had secured the bridge intact at Remagen after a quick advance through most difficult country, and Cologne had been captured. By the middle of the month the Third U. S. Army completed a remarkable operation, which brought it up to the Rhine at Coblenz and thence along the line of the Moselle to Kyllburg. The Sixth U. S. Army Group was forcing its way into the Saar from the south.

Outstanding German Mistakes

This is a good moment to pause and consider the German situation at the time the 21st Army Group was preparing to cross the Rhine. To my mind, from the time the Germans became involved in war with Russia and America in 1941, the fate of Germany was sealed. From then on the question was how long it would take the Allies to win.

Between Normandy and the Rhine the Germans made three major errors which were to lose them the war in Europe by May, 1945. The first was the decision to fight the Battle of France south of the Seine. By failing to surrender the territory between the Seine and the Loire and to take advantage of the Seine obstacle, they suffered those tremendous losses which I have already mentioned, and in addition there were obvious and widespread political repercussions. But they subsequently made a most remarkable recovery. They succeeded in forming and equipping new divisions, and they established a cohesive front on the rivers and canals of the Low Countries. They proceeded to build up a strong mobile striking force, which by December was ready for action.

Then came the second mistake. They launched a counteroffensive in the Ardennes designed to hit the Allies so hard that the German striking force could subsequently be switched to the east. But they failed to win the air battle first; they had not the air resources nor adequate supplies of fuel for a major counter stroke, and were wrong to attempt it. While some progress was made in the short period of bad weather, the enterprise was doomed to failure. A counterattack, Yes; a counteroffensive, No.

Following the failure in the Ardennes, the proper procedure was to withdraw behind the Rhine. The third big mistake was the decision to stand and fight west of the river in the hope of masking the Ruhr.

After the crippling losses sustained in the Battle of the Rhineland, the end of the war was only a matter of weeks. The Germans had not the manpower to raise new divisions, and in any case their industry could not have equipped fresh formations. The policy of dispersing German industry rebounded now that they were unable to assemble war material or move it to the fighting troops. Their remaining oil refineries and storage plants were being subjected to increasingly heavy air attacks, and their communications were rapidly being reduced to a state of chaos. As a result they had not the transport or fuel necessary for mobile operations, nor had they the tanks to compete with the Allied armored forces in battle.

The Battle of the Rhine

The quicker we could engage the enemy in mobile warfare in the north German plains, the sooner the end would come. While the Battle of the Rhineland was proceeding, the details for the crossing of the Rhine were being worked out. Many engineering and administrative preparations had been initiated back in December, before the Ardennes counteroffensive. In particular, work had started on the roads and railways necessary to establish our lines of communication across the Meuse and Rhine. We had furthermore stocked the Second Army depots with some 130,000 tons of stores for the coming operations. And so the 21st Army Group launched the operation for crossing the Rhine a fortnight after completion of the Battle of the Rhineland. Future history must give the armies great credit for this. It was a most remarkable achievement.

The fortnight between the end of the Battle of the Rhineland and the crossing of the Rhine was one of intense activity. Formations were regrouped and lined up in their correct positions, covered by a screen of troops holding the riverbank. Dense and continuous clouds of smoke were employed to hide our intentions and final preparations.

The attack began on the night of March 23, and by the next morning all 4 assaulting divisions (two British and two American) and the British commando brigade had accomplished their initial crossings between Rheinburg and Rees. The key to the crossing was the important communication center of Wesel, which was captured by the commando brigade after an intense air attack by Bomber Command. On the morning of the 24th, the XVIII U. S. Airborne Corps, with one British and one American airborne division, dropped on the east bank of the Rhine within supporting distance of our guns on the west bank.

The enemy reaction was initially strongest on the northern flank, where three parachute divisions had been concentrated. But generally speaking his power of maneuver was greatly limited by the very heavy air interdiction program which had been originated several days before the assault. The airborne troops took full advantage of his failure to launch any effective counterattack against them and rapidly made contact with the formations crossing the river. The British and American bridgeheads were quickly joined. Some remarkable engineering feats were accomplished in working ferries and bridging the river, and it is interesting to note that the Royal Navy was well to the fore with craft which had been dragged by road all across Belgium, southern Holland and the Rhineland.

We were now in a position to drive into the plains of northern Germany. It was a matter of great satisfaction to see how plans which had been maturing back on the Seine were reaching their fulfilment.

Meanwhile, the Remagen bridgehead continued to engage increasing enemy forces, and in spite of them was steadily expanded. The bridgehead was extended to Bonn and the First U. S. Army began thrusting east and northeast in a drive which had reached the Paderborn area by the end of the month. The Third U. S. Army had crossed the Moselle and, in conjunction with the Sixth U. S. Army Group, eliminated the Saar triangle and brought the whole Allied front up to the Rhine. In the fourth week of March General Patton's forces crossed the river astride Mainz and came up on the right of the Frist U. S. Army.

The Advance to the Elbe and Baltic

Within 4 days our bridgehead over the Rhine had been established, and on March 28 the advance to the Elbe began. On the right flank the Ninth U. S. Army was directed to the sector Magdeburg-Wittenberge. In the center the Second Army was to advance with its left flank on Hamburg. On the left, the 2nd Canadian Corps, after crossing through the Second Army bridgehead, swung north along the Rhine to outflank Arnhem and open up the routes leading northward from that area. Later, the 1st Canadian Corps assaulted across the river at Arnhem and turned into western Holland to establish a protective flank between the Rhine and the Zuider Zee.

The enemy tried desperately to assemble his remaining forces in opposition to our advance. The core of his resistance formed on the Ems-Dortmund Canal, facing the left and center of the Second Army. Bitter fighting ensued. In the meantime, in the Ninth U. S. Army sector and on the right of the Second Army progress was rapid. By April 3, the Ninth U. S. Army had reached the Weser in the Minden area and had linked up with the First U. S. Army advancing from the Remagen bridgehead. The Ruhr was enveloped. The Ninth U. S. Army reverted to the command of the Twelfth U. S. Army Group. The two U. S. armies proceeded with the clearance of the Ruhr and at the same time pushed forces eastward to the Elbe.

The subsequent action of the 21st Army Group may be compared with the drive across northwest France. The German east-west lines of communication to the coast were progressively cut, and a series of right hooks were delivered to round up the enemy. The left flank formations drove up toward the coast to finish him off.

The 8th Corps of the Second Army crossed the Weser near Minden on April 5, followed a few days later farther north by the 12th Corps, which then worked its way along the east bank in an advance that brought it to the outskirts of Hamburg. This wide turning movement loosened the enemy on the left, and while Bremen was masked from the south by the 30th Corps, a hook farther up river came in on the city from the east. Bremen fell at the end of the month.

The First Canadian Army made steady progress, and by mid-April had liberated most of northern Holland. By the same time the 1st Canadian Corps had safeguarded our flank in western Holland and isolated the large enemy garrison there.

The main drive to the Elbe continued toward Luneburg, which was reached on the 18th, and our forces began to line up on the southern bank of the river masking the city of Hamburg. The Elbe was crossed on April 20 and spearheads made straight for Lubeck in order to seal off the Schleswig-Holstein peninsula. At the same time, moving by road, a U. S. airborne corps of two divisions, together with the 6th British Airborne Division, formed a defensive flank facing east on the line Darchau-Schwerin-Wismar. Once across the river our operations were virtually unopposed. The plan for outflanking Hamburg by a maneuver similar to that used at Bremen was actually under way when, on May 2, the Germans came out to negotiate its surrender. Across the Elbe the countryside was packed with a mass of German soldiers and refugees fleeing from our own advance and from that of the Russians, with whom we established contact on May 2.

The negotiations which began in Hamburg led on May 3 to the dispatch by Doenitz of envoys to my tactical headquarters, then at Luneburg Heath. By this time I had ordered a pause in our advance to be made on a line which would cover Hamburg and Lubeck. Some fighting was still in progress with German remnants in the Cuxhaven and Emden peninsulas.

The German delegation which came to my headquarters was headed by General-Admiral von Friedeburg, Commander in Chief of the German Navy. He was accompanied by General Kinzel, Chief of Staff to Field Marshal Busch, and by Vice-Admiral Wagner. I quickly established that they had not in fact come to negotiate the unconditional surrender of the troops on my front, and at once made it clear that I would not discuss any other matters. I did, however, take the opportunity to show Von Friedburg the operational situation on my map; and when he realized, apparently for the first time, the plight of the German armies on the various fronts, he broke down and wept. He hurried off to recommend to Doenitz the unconditional surrender of all German naval, land and air forces opposite the 21st Army Group. On the evening of May 4th, Von Friedeburg returned to my headquarters and signed the instrument of unconditional surrender of those forces.

Cease fire was ordered on the 21st Army Group front as from 8 A.M. on May 5.

(In the concluding installment in the next issue of The Cavalry Journal, Field Marshal Montgomery discusses: The Grouping of Forces; Specialized Equipment; The Royal Armored Corps; Artillery; The Engineers; Signals; Infantry; Airborne Forces; The Medical Organization; and Conclusions.)

Signal Corps Photo

Half-tracks of the 3d Armored Division cross the Saale River in Germany on bridge constructed by the 23d Engineers.

The Armored Engineers

WHENEVER we glanced at a press account of a characteristic sortie of an armored division in the campaign in Europe, we were often overwhelmed by the correspondent's stock of vigorous verbs and appropriate adjectives. The blank armored division "slashed," "ripped," "plunged through," "stormed through," "overran," "annihilated" and, in general, raised so much hell, that, in the minds of most readers was conjured the vision of an unstoppable juggernaut that needed only to be placed in motion and it would not stop until its commander willed it. Such was not always the case, in spite of all of the artistic verisimilitudes of war reporting, and many a tank commander read those accounts with his tongue in his cheek, especially if his attack had been halted by a cleverly laid minefield, an ingenious road block, a demolished bridge, or one of a dozen other means that the not always withdrawing foe employed.

Confronted by these obstacles the tank officer was certain to shout for his armored engineers, who were, if the tanker was battle-wise, within earshot at the head of the column, and the elimination of such obstacles was quickly undertaken.

Let's then take a look at these armored engineers in the armored divisions, the counterpart of the combat engineers in the infantry division; and, the wherewithal at their disposal with which they performed the multitude of jobs that was their lot in order to break the tanks loose through obstacles that would have stopped them.

Of about the same size as an engineer combat battalion (38 officers, 675 enlisted men) the armored engineer battalion is completely mobile with its organic transportation which includes some armored vehicles. It has three line companies and a headquarters company. With its commanding officer a member of the division commander's special staff, the battalion is completely in the tactical picture at all times as to what is happening and the part it will play.

Containing modern engineer equipment with the emphasis upon machinery rather than manpower to obtain results, this battalion's armored bulldozers, air-compressors, flame throwers, mine detectors, gasoline-powered saws, and other apparatus in the capable hands of the armored engineers is one reason for the superlatives concerning the tank units from the newspapermen. It wasn't very long until the combat commander learned the value of the engineer bulldozer. The bulldozer with its highly trained operator could perform miracles in the way of clearing road blocks, improvising by-passes and fords, and it was little wonder that the sharpshooting crews of 88's sometimes gave a bulldozer target priority over a tank. The demolition expert was frequently in demand to eliminate by explosives an obstacle in the path of the advance, and also to create by craters, and the like, barriers on the flanks of the forward

surging armored column. Flame throwers played their part both as offensive and defensive weapons, and, at the onset it was the engineer's portable thrower that did the job later taken on by flame-throwing tanks. As for mine detector crews, not only were the armored engineers masters at this dangerous game, they taught all the troops of the divisions how to operate the marvelous apparatus that was to save lives and equipment in battle. Laying protective minefields or lifting enemy ones became second nature to the engineer. Only in a stabilized situation did the armored engineers clear complete enemy minefields, normally they merely gapped the field sufficiently to get the tanks through and left the remainder, properly marked, for the army engineers to lift.

Early days in the evolution of the armored division saw a larger engineer battalion which included two additional companies: one, a line company, and the other a treadway bridge company. The bridge company was organized and equipped to transport the bridging equipment of the division.

From the time it was first conceived by the Armored Force, the treadway bridge passed through an extreme development period. Initially in a table of equipment drawn up in the fall of 1940, Captain Bruce C. Clarke (now Brigadier General) the acting Armored Force Engineer, included a bridge of treadway design unsupported for short spans and trestle supported for long ones. The length of this bridge was roughly 300 feet and no attempt at adapting it to a floating type bridge was undertaken until 1941 when the late Colonel T. H. Stanley and his assistant, Major W. E. Cowley, energetically and successfully accomplished that conversion with the development of rubber pontoons. At first known as the M1 floating treadway bridge, later superseded by the M2 floating treadway bridge, it was tested exhaustively under field conditions by armored divisions in prewar maneuvers. Results of these tests and advancements in tank and vehicle development with regard to weight and dimensions led to a corresponding trend in the M2 bridge development, with the result that a shorter and wider tread was used. Specially designed trucks were manufactured to transport and handle the basic load of 872 feet of M2 equipage with which each engineer treadway bridge company is now provided. Here again the emphasis was on machinery instead of men to do the backbreaking work with each truck being provided with a hoisting mechanism for use in unloading the bridge parts and in constructing the bridge.

The treadway bridge is the armored engineer's baby. He swears by it, he hoards it, he almost reveres it. Let someone attempt to argue the merits of other types of portable bridges and he will quickly point out that in the ETO, almost without exception the tactical bridge first open to traffic was the treadway bridge. Constructed under every condition that modern warfare created, this modern equipment utilizing a minimum of construction personnel trained to handle the bridge parts with mobile engineer cranes constantly had German high commanders baffled with the rapidity with which supposedly impassable barriers were overcome. This was not only true in the case of large streams but also in the bridging of small gaps created by demolished bridges, culverts, or road cratering.

A cleverly sited, though small, crater in a tank defile will certainly stop an armored column. Supporting Brigadier General Bruce C. Clarke's 4th Armored Combat Command (the "spearpoint of the spearhead" of Patton's sweeping drive in France) for two and one-half months, the battle-wise and sweating engineers of Company C, 24th Armored Engineer Battalion, constructed no less than 21 bridges, the average length less than 50 feet! No wonder then that Lt. Col. L. E. "Bud" Roth, in an operational report wrote—"It soon became apparent that short unsupported span treadway sections were our most important bridge, and were a tactical success due to the rapidity with which antitank obstacles could be crossed." German top-ranking officers subscribed eloquently and at great length to this fact, when, after capture they confessed their complete surprise and consternation at the speed of the engineer elimination of obstacles which permitted impatient American tanks to repeatedly nip and slice off the tail ends of retreating German columns. It is not surprising that this marvelous piece of bridging equipage is rated by many top Allied commanders as one of the principal items of tactical equipment contributing to our final victory.

To Major General Lunsford E. Oliver, now on Army Ground Forces Staff, goes much of the credit for the development of the treadway bridge. As Armored Force Engineer, in the early stages of the expansion of the Armored Force, he, realizing the urgent need for a military bridge capable of being transported by the armored engineers in the fast moving, highly mobile armored division, successfully pushed to completion the adoption of the now famous bridge. Years later, in late March 1945, as his 5th Armored Division was crossing the Rhine River at Wesel, Germany, it was using the treadway bridge in the development of which he had played so important a part. Standing on the bridge in midstream as his tanks roared by, the General urged them on at greater speed growling to the engineer officer at his side ". . . The bridge can handle them faster than this, dammit, I know!"

Although the treadway bridge company was taken out of the Armored Engineer Battalion under a reorganization and made a separate unit under Corps or Army control, experiences in the ETO proved it was necessary to make such a company available to an armored division if the complete effectiveness of the division was to be realized. An outstanding example is offered by the 5th Armored Division. On the eve of September 5, the division reached the banks of the Meuse in the vicinity of Sedan to find all the bridges

destroyed. With the attached bridge company (the 993d) the divisional engineers immediately began the construction of three treadway bridges across the 200-foot stream. Erected under enemy fire the bridges were rapidly completed and allowed the division to press onward through Luxembourg and into Germany without losing momentum. No doubt due to the extended position of the division with respect to corps troops, a delay of several days might have occurred in this particular situation had it been necessary to await Corps Engineer Troops and equipment. Small wonder then that the armored divisions are insistent that the bridge company be included as a part of the division.

On the morning of March 24, 1945, the 30th Infantry Division had just gotten its assault troops across the Rhine River a few miles upstream of Wesel when Captain McAdams' engineer treadway bridge company of the 17th Armored Engineer Battalion ("Hell on wheels" 2d Armored Division) went into action. For days his men had been keyed at high pitch for the mission that every engineer dreamed of—bridging the Rhine! Planning was complete, each man knew his job and executed it well. Seven and one-half hours after commencing the bridge, it was complete. Extending 1,250 feet across this tremendous water barrier it allowed the corps commander to cross his tanks and commit them in support of the 30th's doughboys hours ahead of even the most optimistic plans. This rapid crossing, buildup, and exploitation so surprised and confused the Germans that they were completely demoralized. It helped win for the treadway company the Presidential Unit Citation which President Truman awarded when he visited Berlin.

Almost without exception, it was the same story throughout the campaign in Europe with the engineers surpassing in speed all estimated times of completion of the many tactical bridges they constructed.

Engineers, to a man, love to build bridges. Many of their apparently less glamorous missions are none the less important. Consider for a moment the typical entries in an armored engineer battalion daily log:

* * *

"29 Aug 44—2d Platoon, Company C, cleared mine and roadblock obstacle. Knocked out 20mm gun emplacement and several enemy—no prisoners. Platoon mission to create diversionary action."

* * *

"11 Sept 44—2d Platoon, Company B, constructed 168 feet of floating M2 treadway prior to daylight of 12 September. Remaining engineers committed as infantry during night—securing, outposting, and mopping-up bridgehead. Battalion CO severely injured in action and evacuated."

* * *

"20 Sept 44—1st Platoon, Company A — Armored Engineer Battalion, and C Company — Armored Infantry attacked and entered Château Salins; engineers clearing 200 yds of abatis, roadblocks and mines, opening route to northeast for Task Force."

* * *

"24 Sept 44—Plans made to continue attack to northeast—. Severe enemy counterattack was preceded morning of 24 Sept 44 by heavy artillery concentration in Company B area. Commanding Officer and Executive Officer, Company B, KIA. At 1400, 24 Sept 44 CCB considered situation untenable and ordered engineers—to withdraw through Foret de Gremercy."

* * *

"26-27 Dec 44—2d Platoon, Company C, with advance guard CCR, supported advance of Task Force by removing mines ahead of tanks, reconnoitering possible routes and outposting sector of Task Force area upon arrival in Bastogne. Minefield removed."

* * *

Basic training of engineer soldiers includes that of infantry missions and the Armored Engineers, who proudly display the castle of their branch, had ample opportunity to put it into effect. Captain Don Hatch, veteran soldier and commander of an armored engineer company holding Hill 318 southeast of Arracourt, was ready to turn in his castles for a pair of crossed rifles on the morn of 29 September when in the early autumn dawn the Krauts attacked and overran both his 1st and 3d Platoons. Massing tanks and infantry the hill was in German hands by 0730. Hastily reorganized and bolstered by a platoon of Tank Destroyers, the engineers attacked and retook Hill 318 by midafternoon. Hand placed explosive charges accounted for 4 Panther Tanks, the TD's added an even half dozen more.

For his reconnaissance, the Armored Division Engineer depended on his engineer reconnaissance sections which were always a part of the advance guard in the tank columns. Dependent almost entirely upon radio communications, difficulties were at first experienced due to the limited range of the sections' radios. This means of communication was corrected and improved as time went on; to prevent unnecessary delay it was imperative that the engineer have adequate facilities to obtain vital information on blown bridges, minefields, impassable routes, etc., on which to base his engineer plans. Then, just as a tactical commander, he could mass his personnel and equipment in order to efficiently and expeditiously carry to completion any assigned mission. Engineer reconnaissance sections operating without armored vehicles were particularly vulnerable and often the tank units would make armored vehicles available to the engineers. In a similar way, arrangements were made to utilize division artillery and liaison planes for flying engineer missions. Armored Engineers want armored vehicles and planes organically and if the expectations of armored division commanders are to be realized we expect they'll get their planes and tanks.

General George S. Patton, Jr.

The strife is o'er
  The battle done;
The victory of life is won
  The song of triumph has begun.

Lord! by the stripes which wounded Thee,
  From death's dread sting
Thy servants free
  That we may live and sing to Thee.

THE United States Army has lost one of its most brilliant and courageous generals. On December 21, 1945 in a Seventh Army Hospital in Heidelberg, Germany, General George S. Patton, Jr. passed away after being injured in an automobile accident.

George Patton was a born soldier and a great student of military history and tactics.

From the time he graduated in 1909 from West Point, his career in the army was vigorous and colorful. After graduation he entered the cavalry and served at Cavalry posts all over the United States. He was with General Pershing on the punitive expedition into Mexico in 1916, and went to France on Pershing's staff in 1919.

In November of that year he was detailed to the Tank Corps and after a course of study at the French Tank School, joined the British when they first employed tanks at Cambrai. He later established an American Tank School at Langres, France, but he wanted action, and as commander of the 304th Tank Brigade, fought in the St. Mihiel and Meuse-Argonne offensives, when he was wounded.

In 1940 he was in command of the 3d Cavalry at Fort Myer, Virginia, but was promoted to a brigadier general and placed in command of the 2d Armored Division in 1941. A short time later he took command of the I Armored Corps.

On November 8, 1942 he landed in French Morocco and led the II Corps in the North African campaign. He was put in command of all American Forces in Tunisia and in July, 1943, went ashore at Gela, Sicily with his Seventh Army. In 38 days he had outblitzed the Blitz Kriegers. He then left the Seventh Army to organize the Third Army which he commanded in its spectacular drive across France and Germany.

The Germans had the greatest respect for his fighting abilities. It has been stated by one high German general that General Patton was feared by the German generals more than any other commander.

In December, 1944, the German Ardennes offensive had broken through Allied lines in Belgium, but although it had been checked there was a chance that the lines might not hold unless the Germans could be dealt a strong counter-blow. General Patton's Third Army moved up fast from the south (where the original Allied attack had been planned) and struck a blow on the German flank which sent it reeling back toward the Fatherland. A stunning and final blow from which it never fully recovered.

It is said that General Patton used his armored divisions as Stuart employed the Confederate cavalry.

Robert S. Allen, a United Features Syndicate writer, in an article on General Patton, stated that he considered Patton the greatest tank commander of World War II. Mr. Allen went on to say:

"In grasp of the true concept of the employment of armor and in the successful employment of large armored forces on many decisive battlefields, Patton was without peer in any army, friendly or hostile.

"Yet his first and undying love was the horse. From earliest youth to his untimely death he was the born cavalryman, in the mighty mold of Ney, Jeb Stuart, Sheridan and Forrest. He loved, understood and rode horses as only the born cavalryman can. A large part of his life, and considerable means were devoted to this passion. Also, to steeping himself in the fundamentals of cavalry tactics.

"He knew by memory the details of every consequential cavalry action and campaign from ancient times down. He fought his tanks as the cavalry chieftains of history fought their battles on horses. To Patton the tank was a mechanical modern version of the horse, an implement to wage lightning-fast and paralyzing war.

"With the tank he coupled the airplane. To him it, too, was merely another version of cavalry.

"Until the day of gas-powered mechanical warfare, cavalry had performed the role of executing wide end runs, of breaking through an enemy's lines, of enveloping his rear and destroying his lines of communication and supply. Patton employed the tank-plane team to the same ends.

"That was the core of his genius as a great battle commander and the secret of his fabulous victories.

"But horses were his great love. Time and again, in Africa, Sicily and the ETO, he vainly beseeched higher authority to give him some horse cavalry on the ground that he could employ it with decisive effect to implement his tank-plane team. He greatly admired the Russian cavalry and followed intently the exploits of the Cossacks on the Eastern Front."

In a recent letter to Major General John K. Herr, U.S.A. retired, former Chief of Cavalry, General Patton wrote:

"At the Secretary of War's press conference, I stated

that had we possessed Cavalry in Tunisia or Sicily, very few Germans would have escaped. I personally advocate the retention of at least one cavalry division (horse) and the creation of a number of cavalry regiments (mechanized)."

Fate was cruel to this brilliant military leader who continually defied death on the battlefields of Northern Africa, Sicily, France, and Germany, and then, when he was due to return home for a long well-earned leave, was fatally injured in an automobile.

General Patton was buried at Hamm, Luxembourg in the area where he did such brilliant fighting, where his achievements will never be forgotten, and where rest the bodies of hundreds of other courageous American soldiers who fought there with him.

It is the way George Patton would want it to be.

Autoflight Jet Propulsion Unit

A REVOLUTIONARY American version of the German V-1 buzz bomb engine, so efficient it can fly through the air without wings, is one of the latest developments in the field of jet propulsion. Today suitable only for supersonic speed airplanes, tomorrow scientists may apply it to all types of marine and land transportation.

Information released by the Army on a small test model of 2-lb. thrust, which is but four one-thousandths of the size of the V-1 engine in capacity, states that it works perfectly in every respect and, pound for pound, is superior in many other ways to the German propulsion unit. The tiny wind tunnel model is but two feet long and approximately two inches in diameter, is made of aluminum alloy and stainless steel and weighs only five ounces. With a small, lightweight fuel tank, this engine, launched from an inclined plane, would fly through the air without the necessity of wings.

The engine is fully controllable, burns gasoline or kerosene, and, after once being started by means of a small spark plug, will run until fuel is exhausted without ignition being necessary. The engineers who developed it claim considerably greater efficiency for the Klose model, known as the Autoflight jet propulsion engine, over its German prototype by reason of more thrust, less weight and smaller size. The American model also fires many times faster than the German engine, thus developing more power. The wind tunnel model, for instance, when operating at full throttle, fires several hundred explosions per second.

One of the problems yet to be solved in jet engine construction, according to the engineers, consists of sound control, since attempts to muffle jet engines have resulted in great loss of efficiency. Engineers who work in wind tunnels and testing laboratories with jet engines wear earplugs, otherwise they are subject to headaches and ringing ears for several days.

Potential use of this new jet engine is still a subject under government restriction.

COMBAT EXPERIENCES

Now is the time to write us a story of your experiences in combat.

The lessons you learned are valuable to others in the future training of our armed forces.

Even though the war is over, the record of what happened there still is important—and will be for historical reference.

We need articles on armored combat especially.

Now that you have more time, why not write up how your unit fought, what it learned, and the mistakes it made?

Write it your own way. Include photos if possible.

Anything from 500 to 2,000 words or more.

Address it to: The Cavalry Journal, 1719 K St., N.W., Washington 6, D. C.

What have you learned in combat that will help others?

Photo No. 1. Army Ordnance matériel is shown in live storage. This method of storage, developed by the Navy and described in the November-December issue of The Cavalry Journal, is good only for interim storage. The methods described in the story below will preserve matériel for from 25 to 50 years.

LONG TERM STORAGE

by Colonel Fred J. Gilbert, Ordnance

UPON the termination of the war, the Ordnance Department was faced with the gigantic task of preserving and storing quantities of war reserve fighting matériel. With the coöperation of industry and scientific institutions, a new departure from any method previously used to store equipment has been developed. This new method, which has very little if any parallel in industry, might be described as the "canning" of Ordnance equipment.

"Canning" actually means placing various types of fighting equipment in sealed metal containers in order to eliminate the destructive forces of nature in the form of rust, corrosion, mildew, etc., which render our fighting equipment useless when permitted to gain any degree of headway.

Attention to this postwar problem is being given at this time because it is vital that the taxpayers' investment in war equipment be conserved to the greatest possible extent. In line with the philosophy of our forefathers of "keeping our powder dry," it is felt that the majority of this ultra-modern fighting equipment should be placed in permanent storage where it can be kept with little or no attention until it might be needed, or until it becomes obsolete.

By enclosing equipment in sealed containers, maintenance costs can be eliminated. Rather than fritter away energy and funds in recurring maintenance, Ordnance engineers will now be in a position to concentrate on research and development of improved weapons to keep American fighting equipment in the forefront in world preparedness.

The conventional approach to this problem has been through disassembly of complicated equipment and coating with Cosmoline. Due to the complexity of the newer equipment, it would hardly be possible to reassemble under emergency conditions and meet a deadline.

Common experience looks upon ordinary warehousing as a satisfactory method of storage. Ordnance Department experience definitely proves that in many cases inside warehousing permits serious corrosion. The astronomical production of the present war has increased the requirement for storage space to the extent that if warehouses were to be used, the space now available to Ordnance would have to be increased many, many times, and still would not provide adequate protection.

Any maintenance of complicated matériel in Ordnance warehouses necessitates a continuous schedule of

overhaul and relubrication. For example, an antiaircraft gun, which must be overhauled every 12 to 18 months to keep it in operating condition, costs from $1,000 to $5,000 per gun per overhaul.

Dehumidified warehouses have been suggested as a method of eliminating the maintenance burden—but only specially constructed warehouses can be dehumidified and these would be extremely expensive to build and operate.

It is important to emphasize that ordinary so-called "air-conditioned" buildings are inadequate, since it is necessary to maintain a relative humidity level below 30 per cent at all times to insure absence of corrosion, whereas many air-conditioned buildings operate at a relative humidity of from 50 to 70 per cent.

The average person realizes that rust or corrosion of simple metal objects exposed to the out-of-doors is less serious in certain dry localities in the far west. Investigation in coöperation with the weather bureau has established that no part of the United States consistently has a relative humidity at the safe level (below 30 per cent). In fact, in Ordnance equipment where "breathing" and condensation occur, rust and corrosion have been worse in some depots in dry areas than in other parts of the country. Unfortunately also, the relatively dry areas are sparsely populated and are relatively inaccessible, increasing the difficulty of rapid redeployment during emergency, after concentration in such localities. Fortunately, "canning" permits independence of locality, since corrosion factors are eliminated, thereby permitting strategic deployment of fighting equipment according to the demands of the situation. Such localities may even include advance bases, on tropical islands, in the Arctic, or in the Canal Zone, without imposing any maintenance burdens.

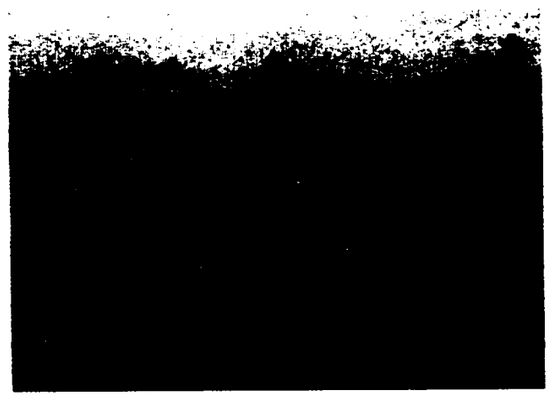


Photo No. 4. Gasoline storage tank for storing artillery.

A plastic form of protection of the sealed type has been developed, known as strippable film* to be used for storage of equipment during comparatively short periods, such as three to 5 years. This plastic hardly is adequate for indefinite long-term storage, but appears to be one of the most promising means of preserving matériel for interim storage. (See photo number 1.)

In order for rust or corrosion to occur, it is necessary that both moisture and oxygen be present. However, if the moisture content is very low (below 30 per cent relative humidity), no deterioration of metals is to be expected.

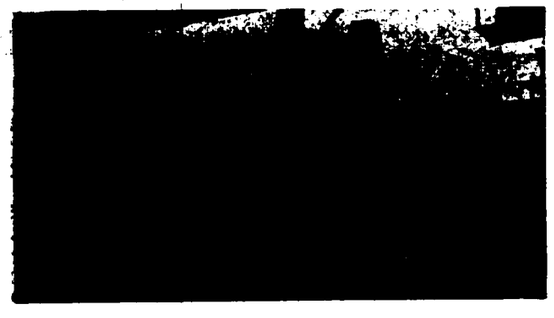
The cans are actually metal packages of the following types:

(a) Hermetically sealed steel containers filled with either dry air or nitrogen; or in some cases a dessicant such as silica gel, is placed in the container to absorb the moisture.

(b) Aluminum containers connected to the atmosphere through a breather which balances the pressure and dehumidifies all air entering the container. It will be noted in photograph number 2 that this type of container will permit the wheels to remain in place on the gun carriage outside the can during transportation, so that it is truly a dehumidified warehouse on wheels.

(c) Steel igloos fabricated from sheet steel originally intended for bomb bodies. In this type of container can be packed, for example, one 240mm howitzer on wagon,

Above: Photo No. 2. Aluminum "warehouse on wheels."
Below: Photo No. 3. Igloo fabricated from sheet steel.



*See "Live Storage" in the November-December, 1945, issue of The CAVALRY JOURNAL.

and in addition to this, 12 75mm howitzers. (See photo number 3.)

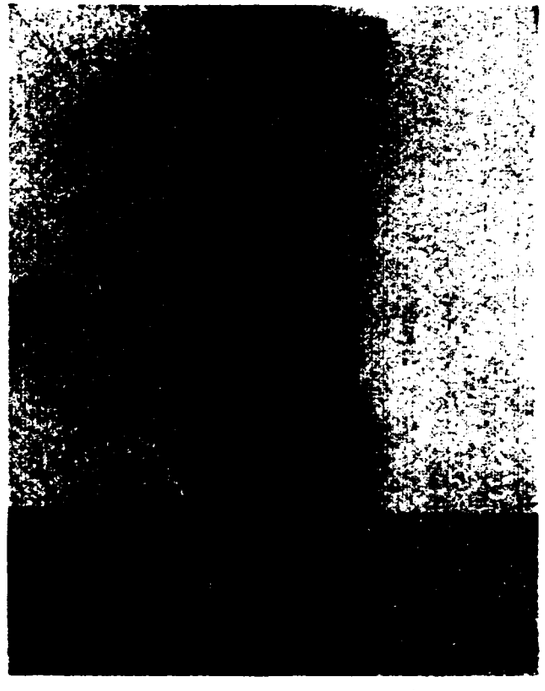
(d) Government owned gasoline storage tanks up to and including tanks of 55 feet in diameter are also contemplated for storing artillery and tank and automotive equipment. (See photo number 4.)

Both the igloo and gasoline storage types are either statically or dynamically dehumidified. In some cases the use of a vapor phase inhibitor is being tried.

The proposed container for packaging .30 caliber M1 rifles and M2 carbines (see photo number 5) for long-term storage is a welded steel drum 38-13/16 inches long, with a diameter of 14⅛ inches. Ten carbines are disposed symmetrically in a welded carrier assembly which is fabricated from steel stampings and pipes or tubes. The carrier assembly is provided with a handle to facilitate removal from the container after it is opened. Glass fiber material is used in several locations in the assembly for cushioning. The carbines are secured in place in the carrier assembly by stamped end pieces and steel bands.

Provision is made in the carrier for 10 slings and for sufficient dessicant material to maintain a relative humidity not in excess of 30 per cent over the range of – 56 degrees F to + 160 degrees F. The atmosphere of the container will be air. The carbines will be coated with a preservative oil, conforming to U.S.A. Spec. 2-122.

Photo No. 5. Container for storing M1 rifles.



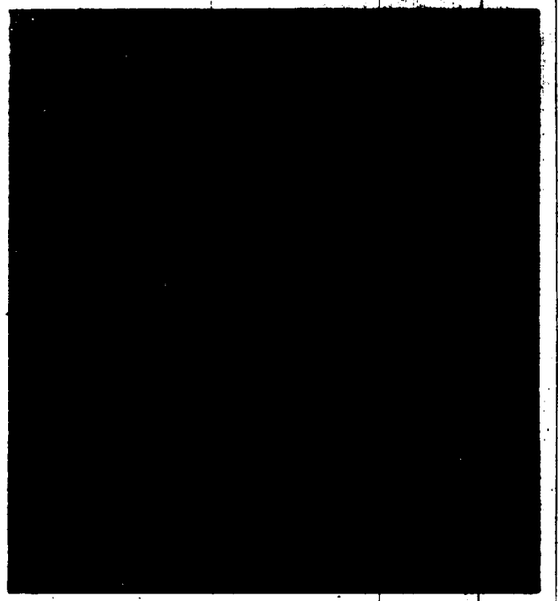


Photo No. 6. Container for storing machine gun.

It is planned that the final assembly of carbines in the container will be carried on in a room with a temperature of 70 degrees F and a relative humidity of 40 per cent. The cover of the container will be seam welded after the carbines are in place to form a hermetical seal. The slings will be treated before being enclosed in the container. Also, the carbines and magazines will be dried in an oven before being dipped in warm oil.

The gross weight of the container is approximately 106 pounds. This compares favorably with a comparable weight of 98 pounds for the regular export pack heretofore used for 10 carbines. It is estimated that the cost of packaging the carbines in the proposed container will be approximately $2.00 per carbine. The comparable cost of packaging in a conventional export pack would be approximately $1.00 per carbine. However, it is believed that superior protection afforded by the hermetically sealed container far outweighs the additional expense.

The container proposed for long-term storage of the .50 caliber M2 Browning aircraft basic machine gun, is a welded aluminum cylinder 59⅜ inches long by 7¾ inches in diameter. (See photo number 6.)

One machine gun is mounted in the container by suitable support members. Provision is made within the container for dessicant material sufficient to maintain a relative humidity not in excess of 30 per cent over the range of – 65 degrees F to + 160 degrees. The atmosphere of the container will be air. The machine gun will be coated with protective oil conforming with U.S.A. Spec. 2-122. The final assembly of the machine

Photo No. 7. Packaging method for .45 caliber pistols.

gun in the container will also be carried out in a room with conditions as outlined for the carbines.

The cover of the container will be seam welded after the machine gun is in place to form a hermetical seal. The end caps of the container are assembled with end dished inward in order to provide means for readier handling of the container. The gross weight of the loaded container is 80 pounds. The corresponding weight of the conventional export package for the .50 caliber aircraft machine gun is 104 pounds. It is to be noted that a substantial reduction in weight has been made in the use of the aluminum container. The estimated cost of "canning" machine guns in the proposed container will be approximately $14.00 per machine gun in lots of 25,000, whereas the present standard export package would cost approximately $10.00 per machine gun.

The particular method used to pack the .45 caliber pistol is shown in photographs number 7 and 8.

The superior protection afforded by the hermetically sealed container far outweighs the additional expense. The metal type of container may be stored in the open indefinitely with only nominal surveillance, whereas the conventional wooden boxes would deteriorate under average conditions in this country. In the tropics or in sub-tropics, the organic material in the conventional export boxes would be subject to attack by insects and mold; whereas the metal container with a suitable preservative would furnish adequate protection over a period of years with normal surveillance.

Strategically a number of important observations are made possible of attainment by the adoption of metal containers. First and foremost, the adoption of the container will make it possible to remove reserves of machine guns, etc., to any point in the world to storage out-of-doors and so stored will be in a completed assembly condition ready for action immediately upon removal from the container.

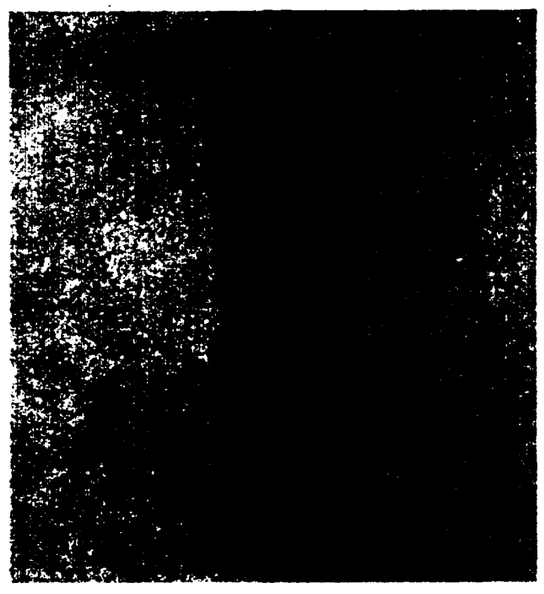
Needless to say, it will be possible to redistribute the reserves of machine guns, pistols and revolvers, so protected, at any time, in any manner designated by strategic and tactical considerations. Assembled reserve stores may be removed to a different theater or they may be widely distributed to any theater to minimize the possibility of destruction by surprise attack. Wide dispersal would not be possible in a fluid situation if the containers did not provide substantial protection during open storage with little surveillance.

The question naturally arises as to what fighting equipment will be put into the cans. Experience has taught that advances in weapons are relatively much slower than advances in transportation. Transport vehicles which follow commercial practice will not be canned. Weapons in most cases will be canned.

The costs involved in "canning" are a vital consideration. Study of the problem has proven that canning is actually the cheapest way of preserving Ordnance equipment for long periods, such as 25 to 50 years. Figures now available indicate that the cost of canning to preserve the matériel for this long period will be up to 5 per cent of the value of the matériel. This cost should be the only cost involved, as further upkeep and care are eliminated through this new process.

It should be pointed out that huge sums are invested in Ordnance items. A 90mm gun on carriage M1A1 costs about $40,000 and a 40mm gun with director costs about $17,000. If the traditional method of storage were used at a cost of $1,000 to $5,000 per overhaul, these weapons would cost more in overhaul than their value in 25 years. By canning, it is actually possible to preserve for 50 years a newly overhauled gun for less than the cost of one overhaul.

Photo No. 8. .45 caliber pistols ready for storage.



Where Is That Storm?

Spherics Can Tell Us

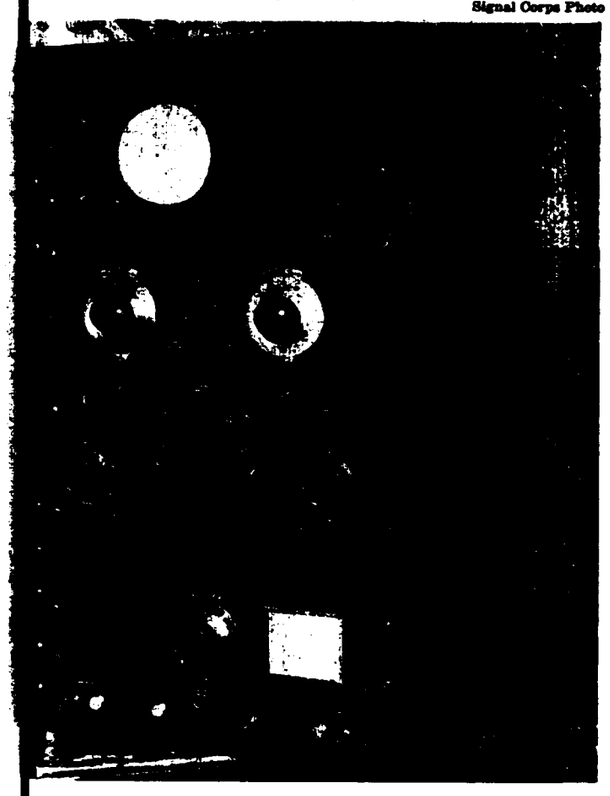
by Signal Corps for the Cavalry Journal

A NEW field of electronics now enables weather forecasters to plot the locations of distant storm centers across thousands of miles of ocean. This is accomplished through the long-range detection of static electricity in thunderstorms, cloud masses, or rainfall.

Spherics is the name for the new electronic, storm-detection technique, and of the static bursts on which it relies. Spherics is based upon the principle that most atmospheric disturbances are accompanied by spheric discharges, and that when these are detected from a distance, they may be assumed to indicate the existence of a storm. Meteorologists thus are able to plot the locations of storms over large areas without making on-the-spot observations.

Since the science of weather forecasting necessitates keeping track of the current weather over wide areas (including oceans, polar wastes, and enemy-held territory), where maintenance of weather stations is difficult or impossible, the acquisition of this data by a few conveniently located spherics stations may effect a significant increase in the accuracy of weather forecasting throughout the world.

Direction Finder and panel layout of "Storm Detector."
Signal Corps Photo

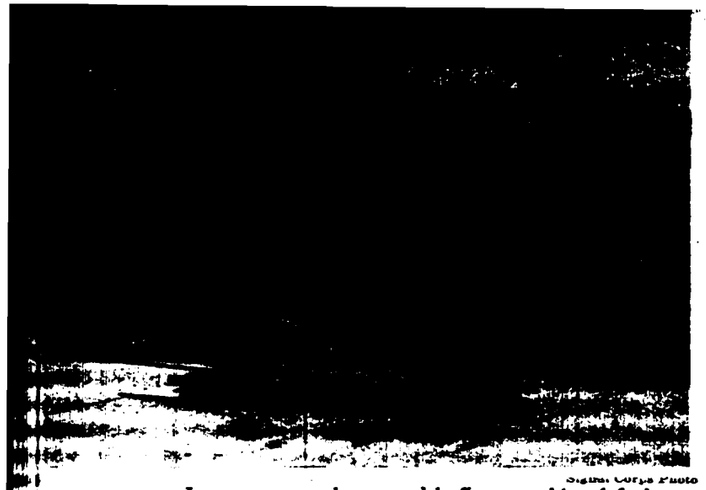


The long-range detection of spheric impulses, upon which the new technique depends, is accomplished by means of a *static direction finder*, which is comparable to the standard radio direction finder in that it uses directional antennas to determine the precise direction to the source of a received impulse. Unlike the more elementary radio direction finder equipment, the static direction finder antennas are nonrotating, and the direction to the source of a received signal is indicated by a flash on the face of an oscilloscope.

The static direction finder consists essentially of two crossed loop antennas, powerful amplifying circuits, and the oscilloscope. The spheric impulses received by the antennas are amplified and applied to the plates of the oscilloscope to create transitory flashes. The position of the flash on the face of the 'scope indicates the direction of the static source. When the direction of the static source is known in relation to two or more such receivers, the location of the atmospheric disturbance may readily be plotted on a map by means of triangulation.

At intervals since June 23, 1944, the Signal Corps has maintained an experimental spherics network covering the western portion of the North Atlantic. This service is credited with having contributed materially to the safety of air flights over the Atlantic. The three initial stations in this Atlantic Coast Network were located at the Signal Corps Engineering Laboratories near Red Bank, N. J.; the University of Florida at Gainesville, Florida; and on the island of Bermuda. A fourth station, sited near St. Johns, Newfoundland, was later added to extend the range of the net and check the accuracy of fixes made by the other stations. Communication between the several stations was maintained by mobile radio sets mounted in 2½-ton trucks. There was no "net control station" as such; the various stations alternated on reporting their observations, and the plotting was carried on at each station.

To verify the data compiled by the Atlantic Coast Network, a program of aerial reconnaissance was conducted over the North Atlantic for several months. Two



Signal Corps Photo

Loop antennas, bases, and buffer assembly of finder.

B-17 bombers fitted with weather equipment and manned by specially trained crews, made regular flights during which weather observers recorded all meteorological phenomena every 15 minutes. In the course of 50 flights, 81 per cent of all data in the flight path compiled by the network were verified by "significant weather" within 100 miles. The minimum dependable range of the individual direction finders was found to be about 2,000 miles; the range of the network, of course, was limited to the range at which three or more stations could take bearings on the same spheric.

Additional spherics networks were later established to cover the Caribbean Sea and the Western Pacific. Experience showed that (1) the spherics technique was not as effective in tropical climates as in temperate regions; (2) that nocturnal observations were less accurate than those made in the daytime; and (3) because of the comparatively low frequency of spheric impulses, deflection of the ground wave causes a considerable factor of error, especially in coastal locations. Another element of error results when the direction finders pick up low-frequency communication transmissions simultaneously with spheric impulses.

The spherics direction finders currently used by the army are based upon a design developed by physicists at the University of Florida. The basic set has been redesigned by the Signal Corps for increased ruggedness and adaptability to military use. Both sets weigh about 450 pounds. The frequency range of later sets was increased.

Most radio direction finders are designed to detect continuous wave signals which are sufficiently enduring in time to permit the determination of direction by rotation of an antenna. The two loop antennas are erected at right angles to each other in such a way that the plane of one is perpendicular to the north-south direction, and the plane of the other is perpendicular to the east-west direction. Each antenna consists of 400 turns of wire wound inside a waterproof aluminum shield.

The loop antennas are especially suitable for spherics work because of their directional characteristics and sensitivity to low frequency signals. A signal arriving from a direction parallel to the plane of a loop produces a maximum response, while a signal from a direction at right angles to the loop plane yields no response. When the loops are mounted at right angles to each other, signals arriving along the ground produce in each loop a voltage the value of which is determined by the strength and angle of approach of each received signal.

The output voltages of the two loops are amplified to the point where they are strong enough to deflect the oscilloscope electron beam, which produces a glowing spot when it strikes the fluorescent screen of the tube.

Through a process of applying voltages, the orientation of the line on the oscilloscope is made the same as the true azimuth of the atmospheric disturbance which caused the signal.

Since the provision of a high degree of selectivity in the amplifying systems of a spherics direction finder would decrease rather than increase its efficiency, interference is a major problem. Undesired signals, which cause interference, result from such man-made static sources as ignition systems, electric arcs, and motor commutators, or from low frequency communications transmitters.

In view of the brief duration of the oscilloscope flashes, a certain element of error is inherent in the instantaneous visual reading of the directional bearings. The Signal Corps is attempting to overcome this problem by developing auxiliary photographic equipment which records the oscilloscope indications on 35mm film. This equipment includes a motion-picture camera through which the film is drawn continuously at a speed of one to 5 inches per second, and a continuous action developer which automatically processes and dries the exposed film received directly from the camera. The film is then projected upon a viewing screen. The camera action is synchronized at all stations of the spherics network by a radio timing unit which produces timing pulses, accurate to within one part in 50,000. This auxiliary photographic equipment is still in the laboratory stage.

The results achieved in an exploratory observational program on interpretation of spheric records, conducted by the University of New Mexico under contract for the Signal Corps, indicate that significant improvements in spherics techniques may soon be possible. Through a study of photographic records of spheric wave forms, the New Mexico researchers found that approximately 5 per cent of the forms have simple repeated patterns, which can be analyzed. A study of the time intervals between these repeated patterns gives evidence of a ground wave and a series of sky waves which bounced back and forth between the earth and the ionosphere as many as 7 times. It is possible thus to calculate both the height of the ionosphere and the distance of the spheric source from the length of the intervals. These results point to the possibility of single-station location of thunderstorms over large areas.

Greatest Smoke Screens in History

*by Lieutenant D. Wilson MacArthur**

THE immense development of air power, both for reconnaissance and for bombing attack, created an urgent need in Britain and abroad for some means of hiding vital war targets and troop movements.

Camouflage, even carried to great lengths, was not enough; the most expert camouflage can often be detected by trained eyes, and the camouflage that will defeat the normal eye is not always effective against the color-blind eye of a camera.

The answer was the smoke screen, used by navies ever since the introduction of steam. Its first obvious application was in protecting harbors and vital war factories from enemy observation and attack. For this purpose the ack-ack screen was devised.

The ordinary orchard heater furnished the basis for research into the production of smoke on a large scale, and after various modifications it emerged as the first smoke generator, producing a dark oily smoke. Next came the larger Haslar smoke generator, also oil burning, and large numbers of these were deployed at British ports and inland. By this means whole areas could be covered by an impenetrable cloud of smoke, through which it was impossible to detect the location of shipping, port installations, armaments factories or dumps. There was, of course, one serious objection. Thick clouds of sooty, oily smoke made life extremely uncomfortable for everyone in the area.

At the same time, research was going on into other types of smoke, and the "chemical pot" was developed. It consisted of a canister containing chemicals which, upon combustion, produce a thick, white smoke. It is ignited with a match and, once ignited, the combustion continues of its own accord.

Another type of chemical "smoke" generator contains fuming acid, forced out under pressure, spraying a liquid which immediately turns into a white fog. Smoke liquids could be used by aircraft for laying screens, while smoke bombs of the chemical type could be shot from mortars, the flash of the propellant igniting them. Various types of smoke floats were also devised for use from ships. Chemical smoke, however, had one great disadvantage; although not so unpleasant as dark oil smoke, it was apt to cause a cough, and men could not remain in it indefinitely. Finally, the American Esso and Besler machines were introduced. These use a special oil which is forced out into the air and immediately turns into a white fog which is very persistent and, at the same time, non-irritant.

Thus, smoke and fog were used in many different ways, ranging from the small smoke bomb, fired from a hand-carried mortar, for immediate protection by the infantryman, and the long-range smoke shell used by artillery for providing cover for advanced units or spotting the fall of shot to the full-scale screen which covered many miles, for ack-ack or tactical purposes.

Apart from the screens laid down to cover harbors and inland targets in Britain, one of the most spectacular uses of smoke was in beleaguered Malta, where the enemy could indulge almost at will in short-range daylight bombing.

On May 10, 1942, H.M.S. *Welshman* docked at Malta with a particularly valuable cargo, which included smoke apparatus. Enemy attack was expected within a very short time, and a smoke screen was immediately organized. It was manned largely by survivors of recently sunk vessels—whose reward was to be a passage home in the *Welshman*, if she survived!

The first attack came, just one hour after she had docked; but by then the screen had become effective, and the enemy dropped their bombs blind through an impenetrable barrage of smoke that hid the target completely. She was not hit. Three more attacks were made at short intervals; but the screen was maintained, and the *Welshman* remained untouched.

From this small beginning at Malta, 7 frontages were soon developed which covered between 7,000 and 8,000 yards, and eventually a coverage circuit of from 5 to 6 miles, which included the whole of the Grand Harbor, was obtained.

This great screen was fully operative by the time the August convoy fought its way to the island, and the ships had the fullest protection when they arrived.

By the summer of 1942 in the Middle East Theater large smoke screens were prepared for the protection of important ports and inland targets, particularly at Alexandria, Suez and Haifa. This method of frustrating enemy observation may have been partly responsible for the fact that no heavy attacks ever developed on these ports.

Smoke was to play a still more vital rôle in the great North African campaign, when many severe attacks, particularly at night, were launched against the harbors seized by the Allies, which included Phileppeville,

*British Royal Naval Reserve; Scottish novelist.

Bougie, Bone and Algiers, and within the next 6 months, Sousse, Sfax, Bizerta and Tunis. By November, 1942, 10 major screens were operating and smoke became a first priority. As each port was captured, the screen was prepared and was in full operation within a day or so.

This led to the provision of ack-ack screens at every port taken in the Sicilian and Italian campaigns. All the stores and personnel were ready before the assault on Sicily began, for by this time smoke had been accepted as an essential part of warfare. In the short time between the first assault, in July 1943, and the end of the year, no fewer than 8 major screens were functioning.

Important as these ack-ack screens were, smoke was to play a still greater tactical rôle in the war. In the Dieppe raid the skilful use of smoke helped the Navy put the troops ashore, and withdraw them afterwards. The ships were able to approach within 600 yards without meeting any well-directed fire because the enemy was compelled to shoot blind into a great wall of smoke. Smoke was provided not only by the Navy but also by the Royal Air Force, who used smoke bombs, and smoke screens laid at high speed by the aircraft. Under such a cover the assault craft stormed in, while the tank landing craft were able to retire into the main screen whenever the fire from the shore became too accurate. When the time came for the withdrawal, smoke screens laid by the aircraft provided a cover under which the craft took the men off the beaches. Without this aid it might well have been impossible to reëmbark so many men.

At Salerno more extensive use was made of smoke. As soon as the troops had landed, they laid out screens on all the beaches to cover the assembly points and the landing of stores.

The battle of Cassino was planned with smoke as a major tactical weapon. From Monastery Hill the enemy had perfect observation of troop movements, artillery concentrations, and all other preparations for an assault. It was essential to discount this heavy advantage, and a great smoke plan was devised. For this the British chemical pot was used, and complete cover was provided for the crossing of the River Gari. When the assault developed, a great screen entirely covered the movements of the troops along the whole of the British and Polish fronts.

It enabled the engineers to throw bridges across the Gari for armored troops, and a continuous haze was maintained over the area in which the artillery was deployed. Afterwards the German commander stated that smoke had been used on an unprecedented scale, and compelled his gunners to shoot blind.

These experiences and developments led eventually to the greatest operation of all, the invasion of northwest Europe. First, immense ack-ack cover was provided at all the points of embarkation and over concentration of troops and matériel in Britain. A similar cover was provided after the landings to protect the Mulberry harbor and other disembarkation points. Smoke was used in the same manner in the landing on the south coast of France.

The culmination of this type of warfare, however, came with the preparations for the crossing of the Rhine. The whole of the operation of assembling troops and matériel for the crossing was completely covered by a gigantic smoke screen, and when the assault was launched the screen extended over a continuous front of 68 miles—indubitably the greatest in the history of war. Between 2,000 and 2,500 men were employed in laying and maintaining this vast screen, in addition to the great transport columns which brought up the equipment and materials.

A tactical screen intended to raise a wall of fog behind which troops and artillery and tanks can be deployed, involves a vast expenditure of labor and material, costing about 4 tons of chemicals per mile of front each hour.

Thus the tactical smoke screen played its vital rôle in many battle zones, and in at least one of these it proved completely indispensable. This was in the Anzio beachhead, where, after the enemy had contained the beachhead, the whole area occupied was under direct observation and artillery fire from the ring of hills surrounding it. Without smoke, it would have been only a matter of time, and very little time, before the beachhead would have become untenable.

Immediately after the assault, however, an ack-ack screen was laid to cover the shipping in the bay, and at the same time energetic steps were taken to protect the troops and artillery. Otherwise the whole area would have been at the mercy of the German guns, which could have picked off lorries moving along the roads, blasted troop encampments, and smashed every concentration inside the beachhead. The screen which was laid down, and maintained throughout the hours of daylight, covered a wide semicircle with a radius of three miles or more, and thus prevented observation of supply dumps and troop movements inside the area.

In the Apennines a different record was set up in the maintenance of smoke screens. Here, where perfect observation would otherwise have been possible, a screen was maintained throughout the daylight hours for 4 months to protect vital supply routes and artillery deployment areas. Much of this time the chemical pot was used, but it caused a good deal of throat irritation, and men on patrols often gave themselves away to the enemy by unavoidable coughing, so the white oil fog type of generator was introduced in the later stages.

The development and employment of smoke and fog screens, far beyond anything ever achieved by the enemy, played a vital part in protecting the harbors and factories of Britain, and in prosecuting the war in the Mediterranean and northern Europe. It undoubtedly saved not only vast quantities of matériel, but the lives of many thousands of soldiers who would otherwise have been at the mercy of German guns and planes.

A Chemical Empire Falls*

by Volta Torrey

NAZI Germany was a chemical empire that rose swiftly, fell suddenly. Its history has been written now by scientists. Civilian chemists and engineers of the U. S. Strategic Bombing Survey have unraveled this unprecedented empire's inside story from secret German records, interviews with German authorities, and extensive surveys of the bombed-out plants and laboratories of the Reich's oil, chemical, rubber, and explosives industries.

These industries were the basis of Hitler's power. They produced the fuel for his war planes, U-boats, tanks, and V weapons. They supplied substitutes for the hundreds of natural products which the British blockade kept him from obtaining elsewhere. By producing innumerable items, mainly from coal, air, and water, these industries enabled the Nazis to blitz and defy much richer nations.

Unlike America, Germany had very little natural petroleum. When Hitler invaded Poland in 1939, he had on hand only enough aviation gasoline to fight for about three months, and only enough automotive gasoline and nitrogen for explosives to last about two months. New fields discovered near Vienna during the war yielded more crude oil, and additional supplies and refineries were stolen from other countries. Even so, more than four-fifths of the Nazis' gasoline, 99 per cent of their rubber, and all of the nitric acid used in their explosives came from Germany's plentiful supplies of coal.

Friedrich Bergius, a Nobel Prize winner, found a way in 1920 to make liquid oil molecules by splitting the complex molecules of coal and forcing hydrogen into them. Since the hydrogen had to be used under pressures up to 10,000 pounds per square inch and at high temperatures, building the compressors used in Bergius plants was a task comparable to manufacturing naval guns. Fifteen times as much steel was required for synthetic oil plants as for ordinary refineries, and the Germans devoted as much steel to the construction of such plants between 1937 and 1944 as would have been needed to build a battle fleet four times the size of the U. S. Navy in 1940.

Another prewar development, the Fischer-Tropsch process, enabled the Germans to take molecules of carbon monoxide and hydrogen from coal and build up various oil molecules. The products obtained by this synthesis had special properties, for which many chemical uses were found. But the more complicated Bergius method was used more extensively, because it was the only one by which great quantities of aviation gasoline could be produced.

Both processes were expensive; gasoline produced synthetically costs from four to five times as much as gasoline obtained from crude oil. The coal needed to make enough gasoline to fill the wing tanks of a Flying Fortress would heat an average-sized home in New York all winter, and an average-sized German synthetic oil plant consumed more electricity than an American city of 250,000.

Regardless of the cost, the Nazis set out long before the war to make themselves independent of other nations. Powder and explosives plants, which had been trimmed down to reasonable proportions by the Treaty of Versailles, were expanded with the help of a state-owned corporation created secretly in 1932. Synthetic rubber production was increased nearly 2,000 per cent in three years. And the production of synthetic liquid fuels was encouraged by slapping a tariff of 30 cents a gallon on gasoline in 1937, and by lending money and guaranteeing prices to the chemical and coal concerns.

Germany's well-developed chemical industry, with 12,000 qualified chemists on its pay rolls in 1937, had grown up in the Ruhr, along the Rhine and in Central Germany, in or adjacent to the coal fields. The I. G. Farbenindustrie held the patent rights to the Bergius process and Ruhrchemie had the rights to the Fischer-Tropsch process. The old plants of these and other firms were expanded, and new plants were erected in the same areas. Thus, the oil, chemical, rubber, explosives, and other industries of the Reich were interlocked not only by their mutual dependence on coal but also historically, geographically, and mechanically.

The gigantic chemical empire that rose under Hitler's regime is described, in fact, as an "octopus" in the official report of the Oil Division of the Strategic Bombing Survey. Its body was the gas-generating plants, and its arms were the many plants that used those gases to produce a long list of chemical products.

This octopus continued to grow, despite many small aerial attacks, until the spring of 1944, when it became the target of an intensive, strategic bombing campaign by both the RAF and the 8th Air Force. It was well defended. Huge, reinforced concrete "dog houses," and brick blast walls shielded the vital parts of the plants; and bombardiers often were deceived by decoy plants—which had wooden platforms built to simulate the appearance of oil tanks, and fireworks that could be set off to make observers think that real plants were being bombed.

*Reprinted by courtesy of *Popular Science*, January 1946.

The bombs used against the synthetic oil targets in the first big strategic attacks were too small. People were killed, pipe-bridges, utility lines, and sewers were damaged, and operations were halted, but the plants recuperated quickly. The first aerial attacks, in other words, merely damaged some of the arms of the octopus. But later, as bigger bombs were developed and hurled against these targets, the gas-producing facilities which were the heart of the whole group of industries were hit and shattered.

Nazi authorities saw what was coming a year before the war ended. The Plans Division of the German Air Force reported in 1944 that "the greatest danger lies in the threat to the fuel supply," and Albert Speer, Reichminister for Armaments and War Production, confidentially warned Hitler that "if the attacks on the chemical industries continue . . . those very materials essential for continuation of modern warfare will be unavailable in the most important fields."

Edmund Geilenberg, a former miner who had worked his way up to be manager of the Brunswick Steel Works, was made General Commissioner for Immediate Measures. These measures included the swift, energetic repairing of bombed-out plants, and steps to disperse oil production facilities and move plants underground. Geilenberg was told by Hitler to tackle the work "with a generous supply of manpower and material and reckless energy."

Exactly one year after he was given almost unlimited authority, American occupation forces found Geilenberg repairing bicycles. At one time, however, he had commanded a labor force of 350,000 persons, and the speed with which his crews repaired the damaged plants made it necessary for the airmen to attack oil targets time and time again.

The most grandiose of the Nazi plans to save their chemical industries were those which called for hiding small plants in the woods throughout Germany, where they would be as invisible from the air as the stills of Kentucky moonshiners, and moving enough additional plants underground to keep the Luftwaffe in the air.

In the opinion of the Strategic Bombing Survey's experts, the idea of moving fuel production underground was feasible. Properly designed and ventilated oil plants could be operated underground with reasonable safety. But the German's underground and dispersal program was never completed. It would have required a full year's labor by at least 200,000 men, more than were employed in the whole oil-refining industry of the United States in 1944, and the Americans and Russians closed in on the Nazis too fast for them to prolong the war this way.

Even if they had succeeded in moving colossal plants underground, the destruction of railroads and sources of power on the surface would have made the plants of little value. Lack of storage space would have kept them from running at full capacity without adequate, regular, transportation service. With no more steel than was used to repair damaged surface plants, however, the Germans could have run pipelines to refineries from oil fields and extended a network of distribution pipes throughout Germany. They might then have been able to supply their armed forces with a respectable quantity of oil products despite the strategic bombing.

Instead, aviation gasoline became so scarce that the Luftwaffe had to stop training pilots in September 1944. Men with only 40 to 45 hours of flight training were sent into combat, countless planes were lost because of the pilots' inexperience, and hundreds of planes were grounded.

Automotive gasoline became so scarce that the speed limit was set at 17 miles an hour and every trip of more than 60 miles had to be approved by a commanding general. Although 1,200 German tanks were massed against the Russians at the Baranow bridgehead in 1945, the Germans had only enough fuel to refill the tanks two or three times. On other occasions, tanks and armored vehicles were moved to the front by oxen. Gas generators which made it possible to use coal or wood as fuel were put on 100,000 vehicles a year before the war ended and had even been put on 50 tanks by V.E. Day.

High explosives simultaneously became so scarce that thousands of shell cases were never filled, and rock salt comprised up to 70 per cent of the contents of others. Such shells boosted the morale of retreating German troops by making loud noises, but were only about 30 per cent as effective as properly filled shells. Nitrogen intended for use as fertilizer was diverted to munitions, but even so there was not enough. Antiaircraft ammunition became so hard to get, according to General von Axthelm of the Flak Artillery, that battery commanders were told never to fire at an enemy airplane unless, first, they were sure it was going to attack the target they were supposed to defend and, second, they felt sure they could hit it.

"In modern war," according to no less an authority than Major General Henrici, the German Army's Chief of Ordnance, "a country's ability to produce munitions decides victory or defeat. The destruction or crippling of the munitions industry is the key to victory."

The destruction of Germany's munitions industry was a by-product of the strategic attacks on synthetic oil targets. American and British air power, in fact, caused the whole German chemical empire to collapse in the last few months of the war like the One Hoss Shay.

This was before the first atomic bomb burst. How, nowadays, can any nation protect its vital war industries from air power?

Aerial and passive defenses far superior to those that Germany had would still leave American industries vulnerable, their report concludes. The best defense is the prevention of attacks.

Some Features of Modern Warfare*

by Major General M. Galakhtionov

THIRTY years ago Germany unleased the First World War, with world domination as its aim. The rules of imperial Germany and their general staff made long and careful preparations for that war and reckoned on terminating it swiftly by defeating France, Russia and England in quick succession. However, even in the first few months a fatal defect of German strategy was revealed, namely, crass overestimation of Germany's strength and underestimation of the strength of her opponents.

The Battle of the Marne and the Russian offensive in East Prussia led to the collapse of the Germans' plans and the protraction of the war. This, in turn, led to an increasing change in relative strength in favor of the Allies and to the detriment of Germany, which began to feel all the handicaps of a war on two fronts.

Germany was vanquished in the field, but the victors failed to reap the full fruits of their decisive triumph. The "appeasement" tendencies which at one time dominated West European policy enabled the Germans to prepare for and launch a second World War.

Hitler and his clique, whose aim was to bring all human society under German domination, first turned their war machine against the countries of Western Europe and registered a number of major successes. Then Hitler Germany treacherously attacked the Soviet Union. The Red Army administered a series of defeats to the German-fascist armies which radically changed the course of the war. By the combined blows of the Red Army and the Allied Armies, Nazi Germany has been brought to the brink of disaster.

In the past 30 years, we have known two world wars, the experience of which furnishes a foundation for the modern science of warfare. But the question arises: is it right to draw general conclusions from two wars that in many respects differ so radically? In other words, how instructive are the lessons of the First World War today?

The answer to this question was furnished in the course of this war. The Nazi adventurers, while they exploited for their criminal war a number of advances in armaments—advances which, incidentally, did not originate in Germany—actually speaking, had no scientifically grounded system for conducting operations.

Failure of Blitzkrieg

The Nazis rejected positional warfare in favor of blitzkrieg. But the German armies, attacking with the aim of inflicting lightning defeat on the Soviet Union, were beaten by the Red Army. Thereupon the Hitlerites changed their line, rejected blitzkrieg and espoused positional warfare. Again the Germans were defeated by the Red Army. These fluctuations, incidentally, show that Hitler and his clique crudely misinterpreted the lessons of the war of 1914-18.

But to show where they blundered, we will deal with some of the features of the First World War.

The first distinguishing feature, which manifested itself in the very early stages of the war, when it still bore a maneuvering character, was the fire power resulting from quantitative and qualitative development of artillery and firearms of all types. Most striking of all was the use of fire power as a means of defense, largely due to the development of automatic firearms. The heavy machine gun, with its faculty for creating a solid and impenetrable zone of fire, became the chief means of defense of fortified fronts. Flanking machine-gun nests in the forests of Caillet, on the heights dominating the approaches to Fort Veau, kept the Germans besieging Verdun at bay for several months. The pillbox or concrete firepost likewise originated in Verdun. For many weeks German artillery was unable to locate and destroy these tiny points. Machine-gun fire was supplemented by artillery barrage. The attacking infantry sustained immense losses and in many cases was unable to reach the enemy's first line of trenches.

War Assumes Positional Character

The effect was to create solid and stable fronts traversing the entire theater of hostilities and behind which the infantry and artillery were ensconced. The war assumed a positional character. Both belligerent sides sought persistently for a way of breaking through into the open and passing to the tactics of movement. An attempt was also made to adapt fire power for offensive purposes, especially the faculty of artillery for demolishing defenses and opening the road for the attacking infantry. Thus arose the tactics of break-through.

Considerable experience was accumulated in the war of 1914-18 in the art of preparing for the carrying out of break-throughs. The concentration of powerful artillery forces, artillery preparation, new methods of firing and creeping barrage were all evidences of the swift development of this powerful arm.

In the First World War considerable difficulty was encountered in developing tactical success into operational success. But here, too, the beginnings of a solu-

*From Krasnaya Zvezda.

tion were found, the full development of which, however, remained a matter for the future. In 1916 the first tank appeared on the battlefield, and in 1918 the Allies launched their offensives with the help of hundreds of tanks and the support of "air divisions."

German war doctrine failed to understand these features of modern warfare. It was extremely one-sided. The Germans' conception of the difference between the First and Second World Wars is very primitive. They held that the first war was exclusively one of position, but that the second was a war of maneuver in which fortified fronts play only a secondary role. They overlooked the fact that a fortified front, and hence fire power, artillery and infantry, played an outstanding part in the first war and that these features would be inherited by the second. They believed that the decisive factor of this war would be mobile formations.

The Red Army drew the correct conclusions from the experience of the First World War. Stalin's school of strategy taught that the form of maneuver that arose in the First World War would be broadly developed; hence the place of honor assigned to tanks and aircraft in our Army. On the other hand, it taught that such features of the first war as fire power, fortified fronts and the necessity of breaking through these fronts would also play a prominent part in the coming war. This explains why mobility and weight of numbers in fire power and maneuver are properly combined in the Red Army, why its artillery received such all-round development and why the fire power of the army increased generally, and why such importance is attached to the infantry. The First World War was not exclusively a war of position; it originated the modern maneuver. The Second World War is principally a war of maneuver, but maneuver combined with powerful fortified fronts. This difference in the character of the two wars was properly appreciated by the Stalin school of strategy.

Now that we can look back on five years of the Second World War, we are able more deeply and correctly to appreciate the experience of the last war. Fire power, fortified fronts and the break-through—those three principal features of the war of 1914-18—have been preserved in this war. This war further developed these features which, in fact, are characteristic of modern warfare generally.

It was already held in the First World War that the break-through, when exploited and consummated, leads to the war of maneuver. This has been corroborated in the present war, not by the Germans, however—who gained their victories at a time when the features of the present war had not yet fully manifested themselves—but by the Red Army in its grand offensive in 1942-44 when fortified fronts already existed.

The tank owed its inception to the positional warfare of 1914-18. Its armor was designed to protect troops from machine guns and its tracks for movement over battlefields crisscrossed by trenches, pitted with shell craters and covered with barbed wire entanglements. The tank became the instrument of maneuver in its new and higher form. The development of tank and mechanized troops capable of exploiting a break-through and conducting maneuvering operations in depth is a new feature of this war as compared with the last.

Another new feature is the extremely rapid and far-reaching development of aviation which, being able to cross fortified lines, attack the adversary's deep rear and strafe installations and troops on the battlefield, is radically changing the methods of warfare.

The gigantic fortified front stretching from the Barents Sea to the Gulf of Finland, from the Baltic to the Carpathians and from the Carpathians to the Black Sea is in itself convincing evidence that the fortified line which appeared in the First World War retains all its significance today. Moreover, the front of the German defenses now pierced and demolished by the Red Army was constructed in accordance with all the rules of field fortification, which have made big strides as compared with the First World War. Fire power has been increased many times over. Pillboxes and bunkers have been supplemented by antitank guns, minefields and obstacles of diverse types. Defense zones now measure scores of kilometers in depth instead of only a few kilometers as in the last war. Furthermore, strong points and fortified lines were prepared deep in the rear.

This powerful defense system was smashed by the Red Army. Of the many achievements of the Soviet science of war, special mention should be made of the supreme skill of our troops in penetrating the enemy defenses. The prime part in this is played by the artillery. A new feature compared with the last war is the combination of fire power and mobility which enables the artillery to escort attacking troops into the depths of the enemy's defenses. Another new feature is the combination of massed artillery and air attacks. Soviet infantrymen armed with tommy guns and light machine guns and escorted by tanks, guns and mortars, solve with consummate skill the most difficult problems which arise in the course of attack and exploitation in depth. Penetrating a defense zone to a depth of 10 or 15 kilometers on the first day of an offensive has become the customary rate of advance of our gallant troops.

As we have already said, the idea of exploiting a break-through in order to turn positional warfare into maneuvering warfare was already contemplated in the last war. But this was only a general idea, which failed to take account of the difficulties involved. For in order to shatter enormous enemy forces stationed along the whole front, an intricate combination of operations of diverse kinds is required which will lead to the demolition of the enemy's entire front and to the defeat of his army formations both in the front and rear. And it is precisely such a combination of successful operations governed by a single strategical plan that we observe in the Red Army's present offensive.

Let us generally and briefly enumerate these operations. They include break-through and its exploitation in depth by mobile forces simultaneously on a number of sectors; disruption of the enemy's rear communications and encirclement of his forces on the main front line and in the rear; demolition of neighboring sectors of the enemy's defenses by attacks from the front, flank and rear; successive development of operations in depth with the object of surmounting the enemy's rear defense lines and surrounding and destroying his forces.

The simultaneous development of powerful attacks along the front and in depth, drives in various directions, continuous harassing of the enemy's flanks and rear, tense fighting to overcome his fierce resistance—all demand high strategical skill on the part of the command so as to lend the mobile operations spread over vast areas a systematic and organized character.

It is impossible to recount here even the most important details of the Red Army's offensive operations in the summer of 1944. But one thing can be said, namely, that in this offensive are combined the advantages of tank and mechanized troops and aviation, adapted to the peculiarities of a war waged on wide fortified fronts and in powerful defense zones. Bold and impetuous maneuvering by mobile forces is combined with methodical and systematic demolition of the enemy's front and secure consolidation of the successes gained on lines carried far to the west.

German Plan for Invading Britain*

DOCUMENTS discovered among the archives of the German General Staff in Berlin have revealed the enemy's plans for the invasion of Britain in the autumn of 1940. The first warning orders for this operation were issued in mid-August about a month after the fall of France.

The forces allotted for the operations numbered 23½ first line divisions, with 17 more in reserve; assuming these to be all at full strength, as they doubtless would have been, and adding the usual proportion of corps and army troops, this would represent a strength of about a third of a million men for the first line forces and a quarter of a million for the reserve—say 600,000 in all. Of the 22 first line divisions, 14 were infantry, 6 armored and two motorized; in addition, there were 1½ airborne divisions, which were to carry out a special operation of their own.

The first line force was to be divided into three armies. The 9th Army on the right, starting from bases on the Belgian and French coast, at Ostend, Dunkirk and Calais, was to land in Kent and Sussex between Margate and Hastings. In conjunction with its operations, an airborne landing was to be made north of Romney Marshes. The 16th Army in the center was to start from the stretch of French coast between Dieppe and Havre, with the British seaboard between Brighton and Portsmouth as its objective, and two airborne landings in conjunction with it were to be made on the South Downs. The 6th Army on the left was to start from the Caen-Cherbourg area and to effect a landing in the vicinity of Bournemouth and Weymouth.

The plan of operations after the securing of the beachheads was to link up the forward troops of the three armies on a general front with the north bank of the Thames estuary about Tilbury across the Gravesend, thence along the ridge of the North Downs southwest to Caterham and west to Aldershot and thence south to the coast about Portsmouth. The 9th Army was then to advance north into East Anglia as far as the Colchester area and the 16th Army into the East Midlands, pinching out London between them, while the 6th Army pushed up the estuary of the Severn. From that line mobile forces were to push further north into the Midlands toward Birmingham and the industrial areas of Lancashire and Yorkshire.

This German force allotted for the invasion of Britain was about the same strength as that used by the Allies later for the invasion of Normandy, though in the latter case the reserves were larger. On the other hand, the forces which Britain had available for defense were pitifully weak. General McNaughton, in command of the 7th Corps, had under him Britain's only completely organized and armed formations—the 1st Canadian Division, part of the 2d Canadian Division, and certain British units; there were a few regular troops and Home Guards, manning the beach coastal defenses, and that was all. The total strength of these forces was probably under, rather than over 50,000 men.

The British plan of defense was for the coastal garrisons to resist as long as possible, making use of such various secret and surprise devices as were available to inflict the maximum losses upon the enemy.

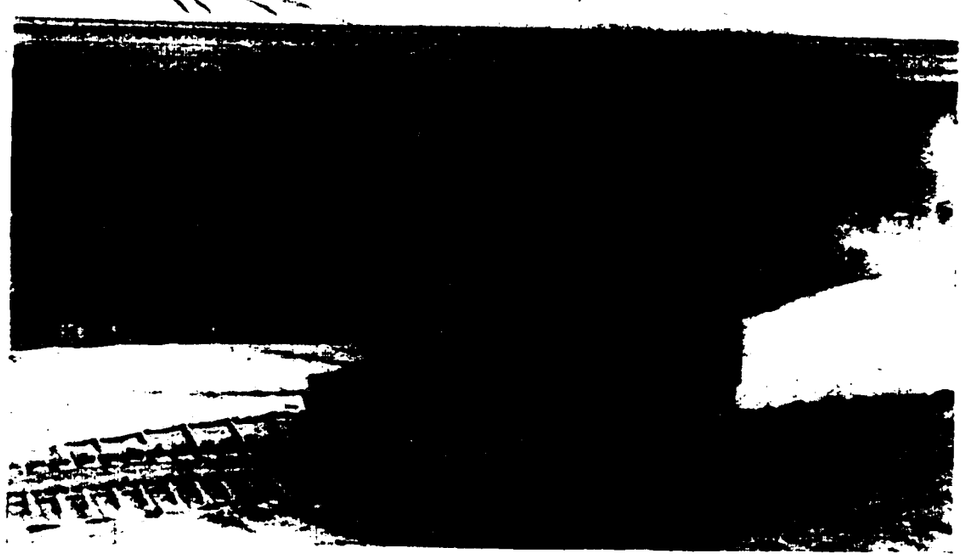
As far as could be foreseen at the time, therefore, the German invasion of 1940, had it been launched, would have been as certain of ultimate success as any operation of war could well be. Heavy losses might have been suffered, but certainly not as heavy as those subsequently incurred in the invasion of Russia in the year 1941 alone. Why the enemy never undertook it, despite the tremendous odds in his favor, of which he must have had a reasonably accurate idea, still remains a mystery. It is probable that his failure to do so was the most fateful of all the many blunders which lost him the war, for with Britain conquered and helpless, Russia could hardly have survived the subsequent attack on her, and America would have been deprived of her only possible forward base from which the reconquest of Europe could have been effected.

*The Tank.

Rolling Dynamic Buoyancy*

Left: The *Swordfish* lands on the *Lily*. Note depression in surface caused by weight of the aircraft.

Above: The *Lily* undulating with the waves caused by a motor launch passing at high speed.



Right: Loaded truck moves along the Swiss Roll while large waves (trough to crest —4 feet) are produced by an M.T.B. racing alongside.

BRITISH scientists have discovered a method of increasing the natural surface tension of water to make it technically possible to build a mid-Atlantic aerodrome or a floating cross-channel bridge.

Inventor of these new devices is Mr. R. M. Hamilton of London, who served at the beginning of the war as a Petty Officer in the Royal Naval Patrol Service. The new discovery has been sponsored and developed by the Royal Navy, and brings dramatic dreams within the realms of actuality.

This latest feat in engineering-on-water began when a brain wave sent the inventor motorcycling at 40 m.p.h. along a tarpaulin stretched over a river ford.

In 1941 Mr. Hamilton was turning over in his mind the general problem of floating airports when he realized the simple truth that if he could increase the natural tension of water it would support weights. He then borrowed a length of farm paling and some tarpaulin from a farmer. Bridging a local ford with them, he crossed on his motorcycle. As he crossed, he found that he was being supported on the surface of the water. He also realized that as he went at speed he made a harder surface.

Ordinary tension will support a needle on the water's surface. By putting a flexible synthetic surface on the sea, and by increasing the tension about 400,000 times, it has been found possible to support heavy lorries and aircraft in mid-ocean.

It was not until 1944 that the first practical result of this discovery was employed—the "Swiss Roll" pier, used in the Normandy invasion.

In *Swiss Roll*—a flexible canvas-and-wood jetty—a tension of 18 to 30 tons is applied to any length stretching from ship to beach and enables a laden truck to be driven ashore in safety over the sea.

Some 2,700 feet of *Swiss Roll* were in continual use at the Mulberry invasion harbor at Avranches in spite of the appalling weather conditions encountered there.

The Royal Navy's latest experiments, only recently concluded, with the *Lily* floating airstrip, have been a further development of the same fundamental principle.

Given its name because of its resemblance to a carpet of lily leaves on a pond, *Lily* is a very different proposition to *Swiss Roll*. It consists of numbers of buoyancy cans with hexagonal surfaces, so linked together that they "give" in a controlled manner to the motion of the sea from any direction, yet remain sufficiently rigid to take the weight of a heavy aircraft. These may be used to produce small islands which can be built to any shape or length required, and are easily dismantled, transported and reassembled.

Whereas in *Swiss Roll* tension is applied externally, *Lily's* hexagonal surfaces, when linked together, create their own tension. At present the cans are only 6 feet across and 30 inches deep, but their size could be scaled up to take greatly increased weight.

The Royal Navy's experimental airstrip is the smallest on which practical tests could be undertaken, 520 feet long and 60 feet across. On this an aircraft, laden to 9,000 pounds, has landed and taken off again. A strip of this size can be assembled by 40 men in one hour.

The whole surface of *Lily* is flexible so that it will not break up, but this flexibility is controlled by the use of underwater dampers. The inventor claims that, with the latest type dampers, more than three tons of pressure is required to move the surface at all, and that *Lily* will remain flat in waves up to 36 feet from crest to crest.

The dream of Atlantic aerodromes has seemed unattainable because it has not been possible to build large enough stormproof flat-surface structures. Modern transport aircraft would need a carrier or a strip twice the length of the *Queen Elizabeth*, largest ship in the world. Such a floating structure has hitherto been impractical.

The Navy's new seadrome can be transported in ships and assembled anywhere. With the present size buoyancy can, a *Lily* 2,500 feet long could be transported in three merchant ships.

Lily's possibilities for bridgebuilding are underlined by those responsible for its development.

"To mention a cross-channel bridge immediately places you with straws in your hair," said Mr. Herbert, the mathematician assisting Mr. Hamilton, "but we can say that it would be possible to build a floating bridge 22 miles long that would not break up in a sea."

The principles of *Lily* are so new that it cannot be described in usual terms, and in fact, the British Patent Office did not know in which category to place the invention. Mr. Herbert, who declared that working out the new problems in three-dimensional mathematics was "great fun," likes to refer to it as "rolling Dynamic Buoyancy" or as "a controllable, flexible surface."

*British Information Services.

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They Pioneered a Channel To Tokyo*

by Commander Harold Bradley Say, U.S.N.R.

*Condensed from *United States Naval Institute Proceedings*, November, 1945.

Official U. S. Navy Photo

Underwater demolition team daubing their bodies with a camouflage of aluminum paint before starting their dangerous swim.

Official U. S. Navy Photo

The web-foot attachment gives the underwater warrior extra speed and endurance in the water.

THERE is seldom a job without casualties. On the Balikpapan job, no one was killed, however. Most of the injuries are from near misses by heavy shells, some of them fired by supporting ships, which must continually rake the beach only a few yards from the swimmers. . . . Strangely enough, the swimmers fear snipers less than heavy shells. They frequently see the snipers in the act of firing at them but their bobbing heads present a difficult target and few are injured. It is not extraordinary for a swimmer to receive 25 or 30 near misses from rifle fire in the two hours or less that he spends on the obstacles . . . Swimmers occasionally wear steel helmets if sniper fire is extremely heavy."

The foregoing lines are excerpts from notes forwarded to the Navy Department to aid in describing motion and still pictures taken by Combat Photographic Units of the Underwater Demolition Teams.

The notes gave many other facts essential to correct voicing of the films and the captioning of photographs. Just as matter of factly, they explained that the swimmers did most of their work *20 to 50 yards seaward of the high water mark on the beach; that the beach was narrow with considerable brush along the shore; that most of the fire was machine gun, rifle, and 37mm, although heavier shells from coastal and dual purpose guns were thrown at covering ships.*

To one familiar with the work of the Navy's Underwater Demolition Teams, the notes conveyed a comprehensive picture. To those who knew nothing of their work, as was the case with virtually all folk at home, and even with a large number of people in uniform out in the far places of the Pacific, they would give but an inkling of the story about the officers and men who went to war in blue swimming suits, measuring the depths over fire-swept reefs and beaches or pushing along ahead of them waterproofed packs of high explosives to blast a way for the landing craft.

Good reason the Navy had for not shouting to the world the accomplishments of the Underwater Demolition men. And the last to have sought publicity on their work were the men themselves.

After Tarawa, on to the end of the war, no major landing operation was attempted without reconnaissance, demolition of obstacles if such were present, or both. The Jap had sought to multiply the normal hazard of coral barrier reefs by studding them with great concrete "scullies" reinforced with sharp-pointed rails or logs, with massive log cribs filled with concrete and coral, with sharp-pointed single hardwood logs wedged down into the reefs. In many places he interwound these solid physical obstructions with barbed wire, and frequently tied in antiboat mines among them. With these underwater works the Jap's garrison commanders felt confident that they would be able to trap the waves of assaulting boats and blast them and their occupants to bits. If all of them were not stopped, the Jap commanders apparently felt certain of exacting such cost in blood that an attacker would give up.

If the Navy had not met the problem with its Underwater Demolition Teams, the Jap's reasoning might have borne fruit.

The initial major operations of the Underwater Demolition Teams in the Pacific were highly successful. The amphibious commanders perfected a fire support for these men who went swimming in against Jap defenses in broad daylight that became deadly effective.

After one good example, all the Jap needed to do was to lay traps—antipersonnel mines and other snares specifically designed to destroy the Underwater Demolition men before they could do their work. It was because the Jap failed to take these steps that the Navy kept rigid silence on demolition work. After the swimmers had finished their work and withdrawn with the ships and planes which had laid down fire support, a Jap garrison commander would announce that an attempted invasion had been repelled. . . . Demolition Teams right through to Okinawa and Balikpapan boated and swam to Jap beaches without meeting the traps they expected the enemy to lay for them.

This does not mean that they were unopposed. The Jap rained down shell, mortar, machine-gun and rifle fire upon them; but with doughty LCI(G)'s (landing craft loaded with 20 and 40mm guns), APD's, destroyers, cruisers, even battleships, and the air arm pouring shell and bomb upon the Jap, they were able to carry out their missions with low casualties.

The result was that assault force commanders had complete information concerning water depths on beaches of which we had no previous charts; knew where they could send their landing craft; where amtracs could successfully operate; knew that mines and obstacles were gone. All this information was in their hands from one to several days before a landing. Without this information—without this service of these men who went to the enemy's beaches in swimming trunks, tennis shoes, and one-eyed goggles and carrying little sounding lines and charges of explosives around their waists—most certainly the story of our Pacific landings would have been different.

Although there are those who have pointed out that amphibious landings were not new—the science of getting assault forces ashore against heavily defended coast or beaches was basically a new one, conceived and developed after the war was well advanced.

It was in the early part of the summer of 1943 that Cominch's planning people, conscious of the problem that lay ahead, opened the United States Navy's school for training Underwater Demolition people at Fort Pierce, Florida. Germany could be reached only by armies landing on the shores of Europe. Japan's power could be broken only by seizing the bastions she had created in the islands, minute and great, in the far reaches of the Pacific.

Commander Draper L. Kauffman, U. S. Naval Reserve, who was selected to head the school because of his experience in mine and bomb disposal, and his assistants, proceeded to guess at what the enemy would erect in the way of obstacles; then turned to devising methods of destroying them.

Thousands of Americans who served in England or passed through her ports en route to meet the German saw the improvised defenses thrown up after Dunkirk when she expected the Germans to pour across the channel. These included railroad rails driven into the sands with their outward ends sharpened, "scullies", two-ton blocks of concrete with sharpened steel rails protruding from them; miles of steel tubing or piping fashioned into scaffolding. These devices, interwoven with barbed wire, had been placed in the surf along the likely landing places on the coast.

The officers and enlisted men—all volunteers—who entered training at Fort Pierce duplicated these British defenses and conjured from their imaginations innumerable other obstacles. Then they devised ways to blow them out of the waters, theoretically covered by enemy fire. Seabees were used to build and invent obstacles. Seabee volunteers also constituted the backbone of many of the first units trained as demolition teams, and many were still at the job when the war ended. The first teams were small, units of one officer and 5 enlisted men, which grew with experience until the teams operating in the final stages of the war were composed of 13 officers and 87 enlisted men.

The training the officers and men went through at Fort Pierce, and later in the war at advanced Pacific bases, was rigorous and tough. They had to be able to swim long distances, to dive and work beneath the water; to stand exposure and remain calm under punishing gunfire. They had to learn accuracy and to memorize what they had observed. To most of them high explosives constituted a new field. They had to learn its vagaries. Life preservers of the cartridge inflation type were issued to the swimmers, who in their work in the Pacific would operate in pairs so that one

might help the other were either wounded. Actually, many of them worked without preservers. In Pacific operations, they were equipped with finlike attachments for their feet which gave them greater speed and endurance in the water once they had broken in the muscles on which new strain came.

Complete surprise was so important for that morning of June 6, 1944, in Normandy that there was no opportunity for the Combat Demolition Units to reconnoiter or blast out obstacles in advance of the landings. The Navy and Army combat demolition men poured ashore with the infantry three minutes after H-hour. They landed from LCM's, two units from each. The Navy teams were composed of 8 Navy ratings and 5 Army enlisted engineers headed by an ensign or lieutenant junior grade. The Army teams consisted of 25 enlisted men led by a first or second lieutenant.

The Navy units were scheduled to clear the obstacles farthest from shore; the Army groups, those on the inshore side. The teams were to work together clearing gaps for the landing craft approaches and the paths shoreward which the debarking infantrymen would follow.

Initial landings were scheduled at extreme low tide when virtually all of the obstacles built by the Germans were exposed. It would be necessary to blow these out, even while the first wave was still pushing shoreward through them, so that subsequent waves would be unhampered.

Only those who landed that first morning can really appreciate the hurricane of fire on the beaches, particularly on Omaha, from the guns and rifles on the bluffs. Some units had their gaps—120 yards wide on the seaward end and 50 yards on the shore side—cleared in half an hour. Others were not cleared until three days later. Some teams were wiped out to a man by death or wounds. When the job was done on Omaha, casualties ran around 52 per cent.

On Utah beach where obstacles were fewer and where fire from the shore was lighter, casualties were low, and the whole job was done in a matter of 40 minutes.

Months later, when Vice Admiral Henry K. Hewitt's 8th Fleet moved in to land the Army on the south coast of France, the Underwater Demolition Teams escaped virtually without a scratch. But in this later landing, ships' guns poured fire down on the German positions while the Army and Navy teams blasted out the barricades, the mines and booby traps laid by the Germans.

A week after the landings on Normandy, while the Allied armies were still fighting desperately to widen their foothold on the continent, two of the Navy's enlarged and intensely trained Underwater Demolition Teams in broad daylight swam in to chart the reefs and lagoon depths off Saipan and to remove any obstacles the Jap might have placed there to stop invading forces. In the Marshall Island operations earlier in the year, Underwater Demolition Teams had carried out some quick reconnaissance work; but here at Saipan for the first time in the Pacific war heavy fire support had been detailed to protect the swimmers on a complete and comprehensive survey of the Jap's beaches. About 200 officers and men composed the teams assigned. A mile-long swim faced the team members from the time their boats reached the barrier reef. With two battleships and cruisers slapping shells down on the Jap's shore positions, the men swam in, measuring the water depth every 25 yards. At the close of D-minus one they were able to give accurate data on the depth of water over the area to be used; also the information that it was free from man-made obstacles. Their charts showed precisely the only paths tanks could take to reach dry land, vital information for the Marines who piled ashore next day.

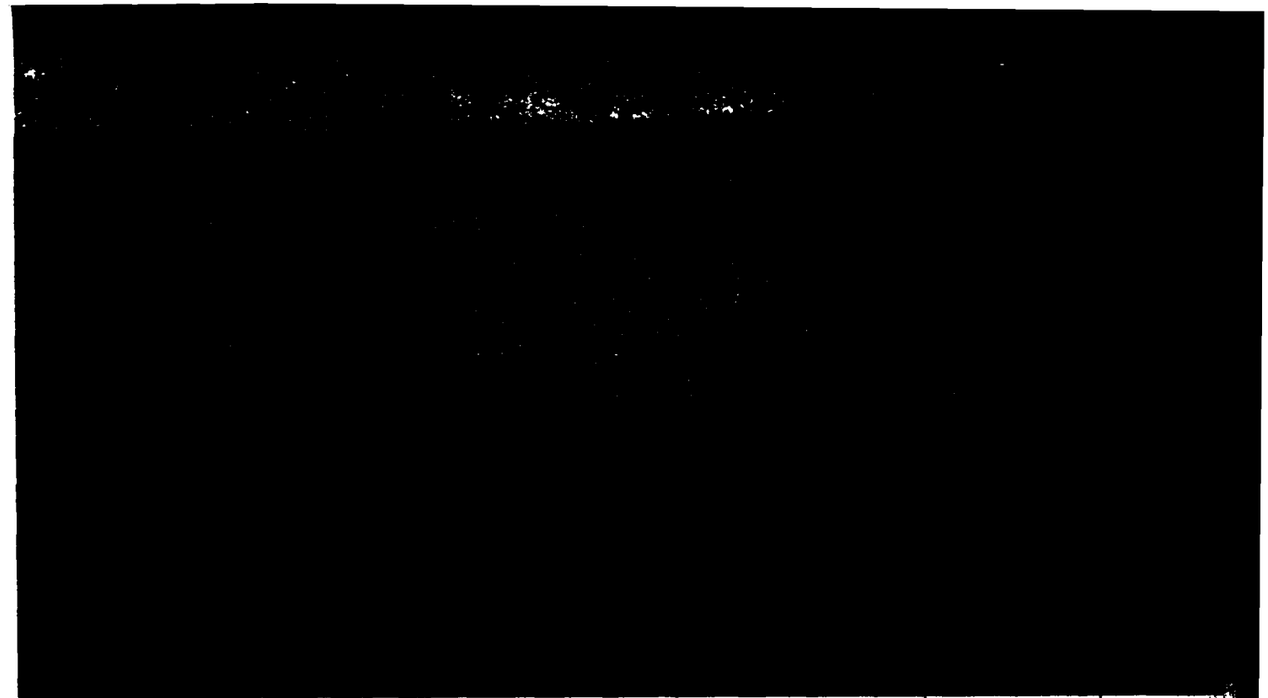
After the first units had successfully landed, the Underwater Demolition Teams then blew a wide channel 6 feet deep through the reef around Saipan so that larger landing craft with guns, men, and tanks could pour ashore in volume to support the initial landing forces.

The leader of one of these teams was Commander Kauffman, organizer of the school at Fort Pierce, who had asked to be permitted to head a team in actual work. Later he was to become chief staff officer to the Commander of Underwater Demolition Teams, Pacific.

At Tinian the Underwater Demolition men along with the Marine Reconnaissance Battalion on D-minus 13 and 12 surveyed the narrow beaches which Lt. General Holland M. Smith intended to use. They did the job in black darkness without detection by the Japs. They found the surf and beach free of obstacles, and located the inland mine fields. The Marines landed on July 24 with few casualties because the Jap had not deemed it possible that anyone would dare use such narrow beaches. He expected the landings off the town of Tinian itself where the beaches were broad—and well covered by Jap gun positions.

The amphibious planners and operators were quick to apply lessons learned in the rapid tempo of the Pacific war. When the time arrived for hitting Guam, the Underwater Demolition Team work was down to a science. New methods were devised for delivering more sharply cut fire support—blistering fire coming down close ahead of the men who swam and waded ashore to discourage Jap machine gunners and riflemen from interfering with their work. Added fire from larger guns was poured on inland gun positions. For further measure, airplanes were detailed to strafe and bomb close along the shore and on island gun positions. LCI(G)'s were sent close in to the beaches to whip the sands for any targets of opportunity and to clean the trees of leaves and snipers.

In fact, the pattern as supplied at Guam was basically that used on through to the end, a continuous roll of fire rising to hurricane proportions in periods critical to the work of the Underwater Demolition men.



Official U. S. Navy Photo

An underwater demolition team swimming in to do their work. Swimmers are to the left, their buoyed explosives charges to the right.

Each time the Underwater Demolition Teams went in for a new job, they expected the Jap to have traps set for them specifically, and each time they found him waiting only with guns, mortars, and rifles. More than 3,000 obstacles they blasted from Okinawa's waters. Before the assaulting troops poured ashore on Balikpapan, a solid line of log cribs had to come out of the water.

Long before these last landings, the demolition crowd had picked up many techniques to improve their work. Recovering swimmers from the water was a highly important problem from the first. Each unnecessary second a man was left in the water as an exposed target counted against his safety. It was vital, once he had his job of the moment done, that he be got to the protection of steel-sided landing craft. Likewise, it was vital when a group of swimmers had laid their charges—designed to go up 5 minutes after the safety fuze was ignited—that they be picked up and quickly carried to safety range. This problem was solved by making rubber boats fast alongside high speed landing craft. Sighting a swimmer signaling for pick-up, the landing craft coxswain would head for him top speed. A man, selected for his strength and dexterity, would plant himself astride the outboard gunwale of the rubber boat, grab the swimmer, and plop him aboard.

A reversed technique was used in putting swimmers and their packages of tetrytol overside. The swimmer went off from one side of the rubber boat while the waterproofed explosives kept afloat by a small bladder were tossed off alongside him. He would then swim or wade to the obstacles, pushing the explosives ahead.

At low tide, many of the reefs on which the Jap had built his obstacles were entirely bare, making a swimmer a cold target for snipers or distant gunners. In such cases if sufficient fire could not be delivered to keep the enemy down, the swimmers worked when the tide was partially in to give them coverage. Underwater Demolition men found that it was hard for an enemy to hit them when he had only their heads at which to aim. Also, they found it comparatively easy to escape Jap rifle bullets when swimming simply by diving and keeping under water as much as possible. Many Underwater Demolition men have come through the war, bringing home as souvenirs bullets that were fired at them and which they caught spent under water.

The tetrytol charges were placed in groups, then tied together with primacord, itself an instantaneous explosive. When the last charge was placed, the swimmers would hastily withdraw for pick-up. The Underwater Demolition men were equipped with waterproof watches which were synchronized. At prearranged or signaled moment, the fuze, or fuzes if groups of explosives were used, would be ignited. Coral, concrete, logs, steel, and masses of ocean would fly skyward hundreds of feet.

When the job was done and the swimmers and their support craft withdrew, Tokyo's radio on numerous occasions proclaimed that the Americans had attempted another landing and been repulsed.

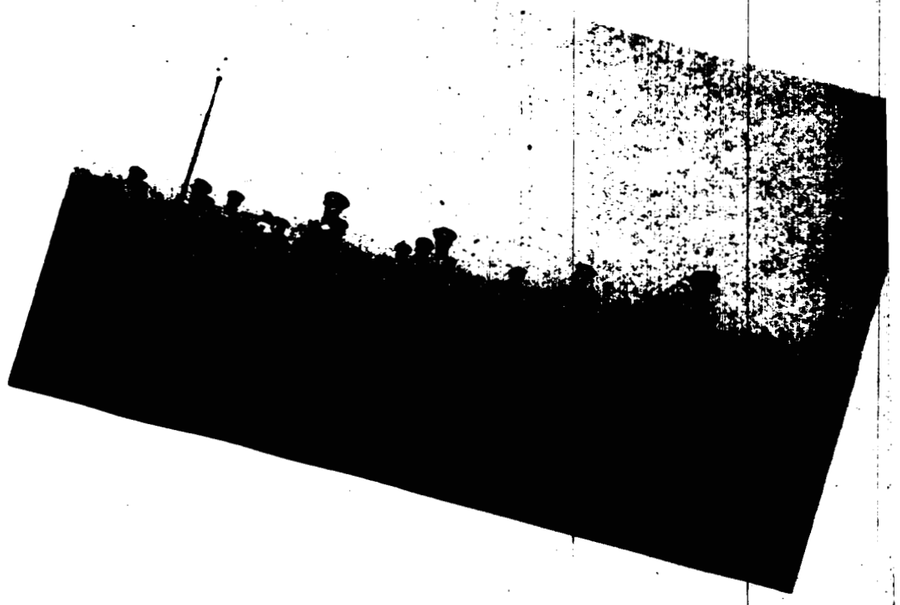
Next day the Marines or Army infantrymen would come piling on the Jap's beaches.

The "Royals" (1st Royal Dragoons), part of the British 1st Cavalry Division, fought successfully in Syria against Vichy French forces. Photograph on the right was taken in Palestine in 1939 and shows a troop of the Dragoons.

BRITISH HORSES IN WORLD WAR II

Pictures by Maynston W. Ehrgott

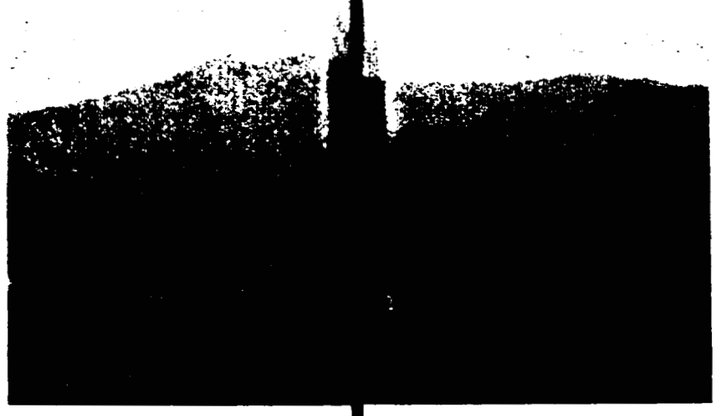
Below: A squadron of British Mounted Police in Alexandria, Egypt, 1943. This and sister mounted units kept order amongst desert Arabs. Men and officers were cavalrymen from famous regiments. They were mounted on tough little Sudanese ponies.



Above photograph shows the 1st Royal Dragoons on the march in Palestine, 1939-40.

Left: The Dragoons after a successful action against Vichy French forces in Syria, 1940-41. Despite inadequate arms they defeated French armored cars disastrously.

Upper Center: A sapper section of the Dragoons during the campaign against the Vichy French in 1940-41.



Who Beats Phantom?

*by Major John North**

The "Phantom" patrols of the British G.H.Q. Liaison Regiment were the "eyes and ears" of the British Army throughout the European War. In every fighting zone they sought information about the enemy. At the request of General Eisenhower shortly after D-day, British Phantom units also functioned for the U. S. Army in the European Theater. The U. S. Army planned to form a phantom force of their own, but the European campaign was won before it could be put into the field.

THE dream of the commanders of past wars has been to know what was happening on the other side of the hill. Today the commander of an army has at his service a tactical air force, specially equipped and trained in visual and photographic reconnaissance. Every aircraft that flies over the battle area is a possible source of information, and if his air force has superior power, the only limiting factor to its usefulness will be the weather.

Nevertheless, however important the air may be as a source of information, it is only one of many from which the general enemy situation is built up. Information will be accumulated by the military intelligence sections; firsthand reports will be available from the commander's own liaison officers in the forward areas. Reliable and timely information is vital to the conduct of operations, and together these various channels should supply it.

Mental Picture of Battle

The commander will need a type of information less easily defined if he is to get the "feel" of the enemy, and is to gain an insight into his mind and intentions from a psychological rather than, for example, a photographic approach. In the British Army this information is supplied by a highly specialized body known as the G.H.Q. Liaison Regiment, which offers a particular contribution to the commander's mental picture of the battle. Its information, which is valuable because it is based on firsthand observation of the enemy in action, is transmitted directly to the commander's own headquarters.

The members of the G.H.Q. Liaison Regiment wear on their shoulders the small letter "P", which stands for "Phantom." In its offensive rôle it is the advance party of the British Army. "Phantom cover" is to be found on every British battlefront, and "Tell us, Phantom!" is the injunction that reaches Phantom patrols through every phase of battle.

What Is Phantom?

The name "Phantom" came from a radio code word —and it well describes the stealthy missions of Phantom patrols through every British battle zone, and sometimes through enemy lines as well. A patrol may consist of no more than a single armored car, manned by an officer and 6 men; but the car will carry highly specialized equipment and each member of the crew will be a radio expert, and much else besides. The patrol will have lateral communication with other patrols, and will be in direct communication with the control station at its own headquarters. From that headquarters will flow a constant stream of information to the commander in chief. His operations map will therefore show within a matter of minutes the latest positions of the farthest-flung front-line troops.

In World War I, Field Marshal Earl Haig had something of the idea of Phantom when he sent junior staff officers to visit the forward positions during a battle and had them report back in person to his headquarters. Employing quite different means, and working more elaborately, Phantom today performs a similar function. The information it gathers often is communicated simultaneously to the local commander and to regimental headquarters. The local commander, in turn, will ask the Phantom patrol in his sector for the latest news of the battle. Phantom has the right of entry to any headquarters. It gets the picture, and is gone.

In Britain's Defense Plan

Phantom did not emerge as a fully developed idea. Its first appearance was in France, in January, 1940, when it operated only for the air force commander. It consisted of troops with armored cars, a platoon of motorcyclists, and intelligence officers, also with motorcycles. Its main mission was to transmit information that would enable the Royal Air Force to play some part in the land battle. When France fell this immature organization became extinct, but between June and October, 1940, it was rebuilt with far wider responsibilities. It was directly employed in the general plan for the defense of Britain.

The founder of Phantom in its new form was Colonel (afterwards Major General) G. F. Hopkinson, who was killed while commanding the 1st British Airborne Division in the invasion of Sicily.

It was he who laid down the lines to be followed in

*British Staff Officer.

the selection of personnel. He was not primarily concerned with a candidate's soldierly or technical qualifications, nor if his only qualifications were linguistic or academic, just so long as he had character and an adventurous spirit. Character was a first requisite. A junior member of the regiment might be called upon to keep his end up with highly senior commanders in the field, and again, in the lonely search for information during the course of a battle, he would be called upon to show a degree of cool initiative which is sometimes to be differentiated from an act of courage performed alongside one's comrades. If a man had the right temperament, the necessary staff and technical training could follow. A member of a Phantom patrol will almost invariably be bilingual, and certainly a radio expert competent to take command of the technical link. Today the G.H.Q. Liaison Regiment is recruited from the entire British Army, but no member is asked to forego his regimental connections.

In the defense of Britain against threatened invasion, the regiment was deployed along the coast, and was in direct radio communication with its headquarters in St. James Park, London, with the War Office, and also with the commander in chief of the Home Forces. Its patrols were attached to local formations rather than to areas, and arrangements were made whereby these local formations were informed as speedily as London of any enemy move within their area. In this defensive rôle Phantom earned the title of "the eyes and ears of the commander in chief." Not until later was it to assume the more adventurous functions conceived by its founder.

Only Facts Purveyed

The appearance of a Phantom patrol is welcomed by every headquarters within a battle zone, quite possibly because Phantom does not trade opinion, but purveys facts alone. Its reports are exclusively factual, and deal only with plans and the results of operations. Its only barter is information, and every message it sends out has two cardinal features—the source of the information, and the time. Phantom also gives an intercept service to all commanders as a matter of routine.

In the British Army organization, a Phantom patrol is allotted to a corps front, and a patrol to each division within the corps. An offensive patrol, which may number 6 officers and 30 or 40 men, offers an even greater opportunity for the adventurous spirit of the regiment. It is then that Phantom becomes the advance party of the British Army.

When an offensive patrol sets out to fight its "radio battle," it is equipped with cars, motorcycles, and 15-cwt trucks. It carries enough radio equipment to establish out-stations deep in the enemy-occupied country (as in Greece and Eastern Thrace), together with a receiver-link to Britain. It was a Phantom offensive patrol that supplied the sole means of communication between the British and Greek Governments and the local Greek authorities until Greece was liberated. In this same fashion Phantom offensive patrols operated in Persia and Iraq.

Normal patrols operated with the British First Army in Tunisia, with the 1st British Airborne Division in the Sicilian operation, the British Eighth Army in the Western Desert and in Italy, and with the British and Canadian Divisions in the landings in France. Patrols were dropped and fought with Special Air Support troops on all their major missions behind the German lines.

Phantom Patrols on D-Day

The value of the G.H.Q. Liaison Regiment was particularly evident during the Normandy landings. Phantom patrols accompanied each of the assaulting British and Canadian divisions and corps headquarters. The first message from the soil of France was received by the Phantom control post in England. It was quickly succeeded by other Phantom messages from the British and Canadian sector. Ultimately its patrols were switched to the Normandy front, and again were first with the news.

During the Falaise battle, Phantom patrols ceaselessly moved back and forth between the jaws of the Gap, and among the British, Canadian, American, and Polish divisions engaged in the pocket. At a time when the German command confessed it had no knowledge of what was happening, Phantom was sending to the Allied Command precise details of troop positions and the locations of German tanks. It was Phantom that gave the Allied Air Forces their bomb lines. Once, a Phantom patrol operated directly between two portions of the same German regiment. Another of its patrols found itself at the actual junction point of the Allied forces, and got through the first message, "The Gap is closed."

At Arnhem, the Phantom patrol consisted of one officer and 4 men in jeeps. A Phantom patrol was first to reach the docks of Antwerp. Phantom was early on the scene in the Ardennes battle. Its patrols accompanied the assault troops across the Rhine, and during the advance through Germany kept the higher command informed of the positions of the leading troops. A Phantom patrol first effected actual contact with the Red Army. One of its officers was the first to get word back about conditions at Belsen concentration camp.

In the minds of those who created and operated it, Phantom is not a piece of mechanism that can be devised by allocating a certain number of men and suitably equipped vehicles to perform a set task. Phantom is an affair of the spirit.

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Last Word from Wake

As Told to a Member of The Cavalry Journal Staff

by Major Henry Stanley Wilson*

From December 11, 1941—three days after the Japs first hit Wake Island—until December 23, when it was captured, the only communication with the island was furnished by a small detachment of army radio personnel. Composed of one officer and 5 enlisted men, it stayed at transmitter and receiver, and, through daily bombings, maintained a 24-hour contact with the outside world until its unofficial sign off.

AT 0530, December 8, 1941, Captain Henry Stanley Wilson, in charge of a small army radio station on Wake Island, telephoned from his quarters to the radio-trailer, which was in position at the airfield.

The sergeant radio operator on duty at the trailer said, "Captain, I don't believe what I'm hearing. It's . . ."

"Put the radio earphones against the mouthpiece of the telephone," Wilson instructed.

The message that was being transmitted in Morse code, in the clear, came over the phone to Captain Wilson in the unmistakable, characteristic sending style of Lt. Colonel Clay I. Hoppough, Signal Corps, Hawaiian Air Force Communication Officer:

"SOS. SOS. *Japs attacking Oahu. This is the real thing. No mistake.*"

Captain Wilson instructed the sergeant to obtain all possible details, and then hurried to the quarters of Major James P. S. Devereaux, U. S. Marine Corps, and commandant of the Marine 1st Defense Battalion on Wake. He woke Major Devereaux, and told him the news.

After a quick cup of coffee, Wilson went to his radio station at the airport and put into effect a plan he had made some time before. When he had come to Wake in October, 1941, he felt that war with Japan was probable. If it came, the airfield where his station was located would be one of the first places the enemy would strike, and for this reason he had picked several alternate positions to which the 1,300-pound, portable set could promptly be moved.

Station Moved Immediately

At the field, he rounded up the crew of 5 enlisted men, some of whom had been on duty during the entire night. In a few minutes after word of the Pearl Harbor attack had been received, the station was being moved to its first alternate position, several thousand yards from the airfield.

Four hours and 45 minutes later the station was on the air and had reëstablished contact with Hickam Field. The time was 1149.

Six minutes later, at 1155, more than 50 Japanese aircraft attacked the island. They were two-engine bombers, apparently from the Marshall Islands, and flew in low. First, they strafed and bombed the airfield. Eight fighter planes were destroyed on the ground, as well as the Marine Corps' radio installations and a large gasoline storage tank. Bombs fell within 100 feet of where Wilson's station originally had been located.

The planes then flew over the Pan-American installations on a small island which is a part of Wake, bombed and strafed the hotel and radio station, and destroyed both.

During the 15-minute attack, two of the 6 in the radio crew were wounded. Captain Wilson was hit above the right knee by a bomb fragment, which he extracted himself, and Sergeant J. B. Rex was wounded in the back by a bomb fragment while on duty in the radio-trailer. Neither was incapacitated. The only damage sustained by the newly moved radio station was machine-gun bullet holes through the trailer, which housed the receiving unit.

When the Jap planes left, Wilson went to the Pan-American installation to salvage what parts might be of use. He found little that would be of value to help maintain his equipment through the bombings that were to follow daily until the island fell.

During the afternoon of the first day, the station maintained a regular schedule of contact with Hickam Field. That night, fearing that the low-flying Jap planes had spotted the radio-trailer, the crew of 6 again moved the station to a position well removed from the general area of the airfield.

*Signal Corps, attached to Hqs. Hawaiian Air Force.

The next day at 1100, the Jap planes returned in force and bombed and strafed the entire island, but this time they flew higher because of antiaircraft fire. A bomb landed within 200 feet of the radio station's new position, but fortunately caused no damage. Believing that the new position had been located, Wilson and the crew again moved the station during the night—an operation that was to be repeated 4 more times, always at night under blackout conditions, before the island was captured after its gallant 16-day stand.

Navy's Radio Destroyed

On December 11, three days after the first attack, the Naval Radio Station on Wake Island received a direct bomb hit and was totally destroyed, thus leaving the small Army Air Force Communications Detachment, which was a part of Headquarters, Hawaiian Air Force (later the 7th Air Force), the only means of communication from Wake to the outside world.

It now was both apparent and reasonable to Wilson that the Japanese would begin concentrating on locating and knocking out his equipment. For three days prior to the attack, Japanese radios from naval vessels in the vicinity had been very busy "jamming" the air whenever messages were being transmitted to Wilson from Hawaii. When he transmitted, however, the jamming stopped and the Japs listened in. On one of these occasions when Wilson gave the call letters the Japs answered and said: "Go ahead." He then asked for the recognition signal, after which the Japs sent nothing more. (The signal was changed at regular intervals, and the Japs did not have it.)

Station Sandbagged With GI Coffee

After thinking over the situation, Wilson decided to sacrifice the mobility of the portable radio set for its security, and the equipment was dismantled from its truck and trailer, and installed in an incompleted concrete ammunition magazine. This was covered with 8 feet of earth by a bulldozer, and camouflaged with brush. It was impossible to dig in more than 4 feet because water was struck at that level. The entrance to the dugout was sandbagged with sacks of GI coffee. This position was used until the island fell.

Navy Uses Army Radio

On December 12, the day following the destruction of the navy's radio, the facilities of the Army Air Force Unit's radio were made available to the naval commander. A receiver was placed at the navy's disposal, and a keying line was provided from the transmitter. The unit maintained continuous, instantaneous communication for 24 hours a day with Hickam Field, and furnished the navy with the same facilities for contacting Pearl Harbor.

The Japs on December 12 made an all-out attempt to take Wake, Captain Wilson related, but the marines made the operation too costly. The enemy had believed, however, that the attack would not fail, and therefore had broadcast to the world the news that Wake Island was in Jap hands on the 12th.

This Jap report of Wake's fall on the 12th, of course, was received at Wilson's headquarters in Hawaii, which then devised a clever means of determining the truth of the Jap report.

Wilson told the story as follows:

"Colonel Hoppough, who was receiving my messages from Wake on the 12th, thought he detected a difference in my style of sending. Operators have a characteristic 'touch' on the key, which can be recognized, and Colonel Hoppough, having talked by radio many times with me, knew my style. The logical conclusion was that if the Japs *had* landed, and I was sending, I was doing so while a Jap pressed a pistol against my head.

"Colonel Hoppough and I are fortunate in having had as a close friend for many years Major General George Van Deusen, known to us affectionately as George Van. On the 13th, Colonel Hoppough, on the key at Hickam Field sent to me, on the key at Wake, the following message: 'George V wants to know if you are still having heart trouble.'"

"He knew that only I would know who was meant by George V. 'Heart trouble' to me indicated 'Fear.' I concluded that the colonel wanted to know if the Japs were forcing me to transmit.

"I previously had sent the information that we had dug in the radio station. And so, when I answered his message by sending: 'Would like to have you and George V join us for tea in our underground boudoir' it indicated the authenticity of the messages, and that Wake Island had not fallen as the Japs claimed.

"The next day he sent a message stating: 'Congratulations, Hawaiian Air Force had believed you were a temporary guest of the Mikado.' I said to myself 'Not yet.'"

During the 16 days before the island fell, the army crew of 6 kept their radio on 24-hour service by using a shift of three men, one maintaining equipment, one operating, and one standing by.

The Japs attacked at least once, and sometimes twice a day, with never less than 35 planes, and usually 50.

No request was ever made from the station for help—only reports on conditions were sent. These included messages concerning the tactical condition, weather information, a few casualty lists, type and number of raiding aircraft, direction from which they attacked, and damage.

By December 23, having "lost face" in the 12th's attempt, the Japanese were ready for an overwhelming effort against Wake Island. Wilson said that it appeared as if the entire Jap navy was attacking, and that the island was surrounded with a ring of steel. The air was black with planes.

In order to get troops ashore, the Japs rammed two perfectly good destroyers onto a reef, wrecking them

but enabling troops to clamber over the decks and jump down into shallow water about 100 yards from the beach. Wilson said that he saw a marine officer on Wake bore sighting a 3-inch piece at point-blank range at the two destroyers. He was hitting them some damaging blows with his unorthodox shooting until the Japs landed and captured the gun.

The last official act of the valiant crew of 6 army radiomen as soldiers of the United States until their liberation as POWs was to destroy all codes, by burning; all cipher devices, by dismantling and throwing into the ocean; and the radio transmitter, by burning out the power transformer and smashing all meters.

Personal Contact With the Japs

Captain Wilson's first personal contact with the enemy occurred when he was interrogated. First, he was asked why he had destroyed the radio transmitter.

"Very obvious," he answered. "So you could not get it."

Next he was handed a coded message and asked to translate it. He replied he was unable to because he did not have the code book.

"Where is it?" the Japs asked.

"I burned it."

"*Burned* it?" the Japs repeated, as though amazed.

They then wanted to see the ashes, and Wilson led the way to them.

The questioning continued, concerning various phases of communications, but the Japs continually returned to the burned code.

Wilson finally told them—emphasizing the word "modern"—that it was the custom in all modern armies when capture was imminent to destroy anything which might be of value to the enemy. "Of course," he added, "I don't know whether you do that in the Japanese army, or not!"

"Oh yes, oh yes, in Japanese army, too," he was hastily informed, which ended the questioning about the code.

Wake Capture Costly

Wilson told of conversations he had with Japanese naval officers on Wake, who said that the Americans fought very well. He asked, "Well, what the hell did you expect?" The Japanese commandant who captured the island repeated: "Fight very well."

Wilson then asked him how much it cost the Japs to capture Wake, and he replied: "Too much." Wilson insisted: "How much?"

"Twenty-nine airplanes, 9 warships, 5,000 Japanese sailors."

The captain was on Wake when the U. S. naval task force shelled and dive-bombed the island on February 23 and 24. The Japs at the time were using a captured marine 5-inch coast defense gun. During the heat of the attack, the gun stuck in recoil position, and the Japs could not get it back to battery position.

They came and got Wilson, and took him through a heavy American attack to the gun and told him: "You will fix."

He explained that he had never seen one of the guns before—he was a signal corps officer. The Japs then handed him a book marked "Confidential," and which contained a detailed description of the gun's assembly, disassembly and maintenance.

"You must study hard," the Japs said.

The attack had not lessened; Wilson did not like it.

He was thumbing through the book trying to look studious, when he came upon a picture of the breech section in which an arrow pointed and a caption said: "Do not remove this plug. If you do the hydraulic fluid will be lost from the cylinder."

Quickly turning to another part of the book to conceal the picture, Wilson began experimentally fumbling around on the gun, and then started unscrewing the plug. It shot out in his hand, and out came the fluid.

The Japs took one look at him, and then led him by the arm back to the camp. When he left the island three months later, the gun still was in recoil position.

During his 5 months on the island before he was sent to prison camps in Japan, Wilson watched the Japs use American civilian contractor personnel and blueprints in a continuation of the projects that were under way prior to the capture of the island. Such work was carried out to the completion of an entire new runway for the airfield. The Japs, however, were unsuccessful in dredging out the turning basin for the submarine base.

The 5 enlisted men who served through the entire period of the siege of Wake Island, Captain Wilson said, were outstanding in their devotion to duty amid trying conditions of poor food, little or no sleep, and under daily air attack. No single complaint was ever made by them either to him or in his presence.

The records roster of the group shows that two, previously mentioned, were wounded. The 5 enlisted men have been recommended for the Silver Star, and Wilson for the Legion of Merit awards.

The 5 enlisted men were Staff Sergeant E. G. Rogers, Air Corps; Staff Sergeant C. H. Hotchkiss, A.C.; Sergeant C. W. Dilkes, A.C.; Sergeant J. B. Rex, Signal Corps; and Pfc. P. F. Fultrup, A.C.

During his captivity Wilson suffered bacillary dysentery, beri-beri, edema, and chronic diarrhea, and weighed 97 pounds when liberated by the U. S. Eighth Army on September 7, 1945, following which he was returned to the States.

Last Word From Wake

It was Wilson's station which sent the famed message during the time of siege: "Send us more Japs." This was sent when a naval officer used the words to "pad out" a line in an official message.

Wilson himself was at the key to send the last word that went out from Wake which was—also unofficial—"The Japs have landed, and the issue is still in doubt."

Four Armies Trained by Great Britain

*by Major Ernest Wathins**

It is sometimes suggested that Britain entered the war unprepared. It is quite true that Britain was unprepared for the war that actually happened, but that is true of every nation that took part in it, Germany included. In fact, one of the causes of Germany's final defeat was that when she created and built up her Luftwaffe she failed to provide the right kind of offensive or defensive force for operations in the air.

An army depends on men and equipment. The disadvantage under which the military chiefs of the Western Allies labored before the war was that they were required to prepare for a war under peacetime economic regime, whereas their opponents had already created wartime economies. In 1938 and 1939 the General Staffs of France and Britain had planned that the British contribution to their joint land forces should be some half dozen infantry divisions, available at the outset of the war and to be under the command of and subordinate to the French Army. That was provided. Four British Divisions landed at Cherbourg in September 1939 and a fifth was formed in Flanders in October of the same year. They were fully mechanized and equipped and perhaps the worst criticism that can be made is that their infantry was deficient (again in common with their Allies) in effective antitank defenses. They were already equipped with the 25-pounder field gun, which remained, unmodified, in full and effective use during the remainder of the war, and the 5.5-inch medium gun, also unsurpassed throughout the whole war, had already been designed, although it was not then in full production.

Until 1939 the British plan for defense rested on two armies, one a small professional army, always trained and equipped, the other a volunteer Territorial Army of part-time soldiers, as a second line. In 1938 that Territorial Army had been doubled in size and had been given responsibility for the manning of the coast and antiaircraft artillery within Britain itself, two tasks for which it was fully prepared by September, 1939. In March, 1939, there came the major break in British tradition. Britain introduced compulsory military service as a peacetime measure and by May, the first "militia" were in training, and some of those men were in action in France later that year. In addition 7 Territorial Divisions landed in France before May 1940, some not fully equipped and sent for training and pioneer duties, but others complete. All of them fought in the battles before Dunkirk.

That phase of the war came disastrously to an end at Dunkirk. The equipment of the whole force was lost and only by a miracle were some 300,000 men brought back to Britain. The British Army faced an entirely new task. They had to prepare for war all over again, this time with the enemy at their gates, encircling their base with his submarines and bombing the war factories with his still unbeatable air force.

It is at this point that the earlier British plans for supply became important. The expansion of British industry for war had started as far back as 1936, with the creation of what were known as shadow factories. These were largely duplicates of existing industrial factories, sited away from the main centers of production and in any case dispersed so that no bombing of an area would cripple any one industry. Each factory needed only two essentials, that it should have access to a railway and that it should not be too far away from an existing center of production, so that a labor force could be brought in each day without the necessity for extensive rehousing. By 1940 most of the factories were under construction. A great many were already in production. By the spring of 1941 the existing British Army had already been largely re-equipped.

But now it had to prepare for another kind of war, or, rather, for two kinds of war. The British Army was committed to the defense of the eastern end of the Mediterranean, and, ultimately, to the recapture of the whole of the Mediterranean area. It was also conscious that some day it would have to undertake a landing on the coasts of German-occupied Europe. Where that landing would be, and when it would be made were matters which could not then be determined, but the fact that in the winter of 1940 mass production of engines for landing craft was started is evidence that the determination to return to Europe to defeat Germany was already a fixed element in British strategy. There was no other way in which the war could be

*British Army Bureau of Current Affairs.

won, even were it to last 20 years. The German attack on Russia and the United States changed the details of the plans, and made their fulfillment so much more possible, but it did not change the pre-existing resolve.

But after December 1941 the British Army was freer to plan and train for specific operations. The first difficulty was to give adequate training for battle troops who had not been in battle and yet who would have to face in their first engagement veterans of many wars. It was impossible to send every division for a tour of duty in the Middle East. Shipping did not permit of it. So the Battle Schools came into existence.

The basic idea of the Battle School was to introduce into the training of the soldier some of the actualities of war, the physical conditions of combat, the sounds of battle and some of the risk. Live ammunition was used. The men went into the training exercise behind their own artillery barrage and there was an enemy, in German uniform, firing over or to one side of them so that men were literally under fire. Mines were exploded in their faces, and there were air attacks.

As time went on the idea was expanded. By 1944, men, British and American, were training for assault landings under conditions almost identical with those they were likely to meet on the section of the European coast chosen for the 1944 assault. Every enemy defense strong point and device had been duplicated. Hundreds of acres of British farmland and pasture had been turned over to exclusive military use and had been ravaged by explosions. Every assault division went through this training.

Side by side with this general training were the Commando operations from 1941 onward. The raids across the Channel, from the small assault on Bruneval to the large scale attacks at St. Nazaire and Dieppe, were not only important in themselves. They were experiments of the greatest value to the later main assault and they were also object lessons that helped to build up the confidence of the whole of the Army. What could be done by men in the Commandos could be done by any soldier, so the soldier came to believe, and he was right.

It is interesting to look back and contrast the equipment available in 1940 with that used in 1944, for nothing shows more clearly the change in tactics and training that had taken place over that period. And with each piece of equipment one must bear in mind the story of its development, first the tactical need for it, then the designing of the thing itself, and the problems of mass production and finally the training of the men in its use, all in a period in most cases far shorter than 4 years.

The infantry needed antitank guns. The 6-pounder and the 17-pounder guns were designed and the infantryman had to become a gunner as well. A short-range antitank weapon was needed, and the PIAT was devised and supplied. The German mine became a difficult obstacle, so an electric mine detector came into being. Portable flame throwers were produced, for town fighting and the reduction of concrete strong points. Never had the infantryman had so much to learn.

So with mechanized forces, tanks themselves were improved, and became specialized. There were flame-throwing tanks, mine-clearing tanks, tank for engineers, fitted with heavy mortars, and finally amphibious tanks, first used in the sea-borne landing at Walcheren in November 1944 and playing a great part in the Rhine crossing in March.

Artillerymen had finally given up their horses before the war. Now they had to become drivers of armored tracked vehicles as well as of wheeled, for the self-propelled gun became a necessity in battle. Not only that, the gunners became airmen as well. Air observation aircraft were piloted by army officers who flew the machines and, by means of radiotelephony, gave the fire orders to their batteries on the ground as they did so.

Perhaps the most vital service, and one too easily overlooked, is that which maintained this complicated equipment in action. Mechanical, electrical, optical, every kind of machine used in the Army is repaired and maintained within the Army, and the men of the Services responsible for that work had to train as soldiers and as craftsmen. The whole technical teaching resources of Britain were thrown into the effort to supply the Army (as well as the Navy and the Air Force) with the technicians it needed.

No account such as this would be complete without some reference to the women who became part of the Army, the Auxiliary Territorial Service. Each replaced a man. At first the jobs they were given were jobs not directly concerned with operations, such as clerks, cooks and storekeepers. But from the very beginning they were driving vehicles under every kind of condition. Then, as an experiment, they were introduced into the fighting sections of antiaircraft batteries, and took over the instruments as opposed to the guns. Mixed regiments were formed, in which women were the majority, and the results they achieved in the flying bomb attacks on Britain were remarkable. At the end of the campaign mixed batteries of men and women were shooting down at night 85 per cent of all possible targets.

Britain in this war, in addition to the vast Navy and Air Force, has trained and equipped four armies: the Army that fought in France in 1940, the Army that drove the Germans from North Africa in 1942 and 1943, the Army that landed in Normandy in 1944, and the Army that destroyed the Japanese in Burma in 1945. Each Army needed different equipment and different training, and each Army, sometimes alone, sometimes as part of a larger Allied force has been victorious. The British have shown once again that while they are not a military nation they are a warlike people.

PRO Pays Off in Battle

*by Major Harold D. Steward**

PUBLIC relations pays off in battle. Combat officers, from a platoon leader up, will verify this. They will agree that soldiers are proud of receiving public credit for their exploits in battle, and that a story in a soldier's home-town newspaper is a great boost to his morale.

Men also like to hear about their unit on national radio networks, read about their outfit in the national magazines, and know that their unit's name is, in general, before the American public.

To accomplish this is the job of the army's public relations officers. To show how it is accomplished, this article outlines how the 1st Cavalry Division's public relations setup was operated through both the Southern Philippines and Luzon campaigns.

In early October, 1944, about 10 days before the 1st Cavalry Division embarked from the Admiralty Islands for the Philippines invasion, 15 war correspondents arrived at division headquarters. The PRO and his staff, which at the time consisted of three enlisted men, were charged with receiving and taking care of them.

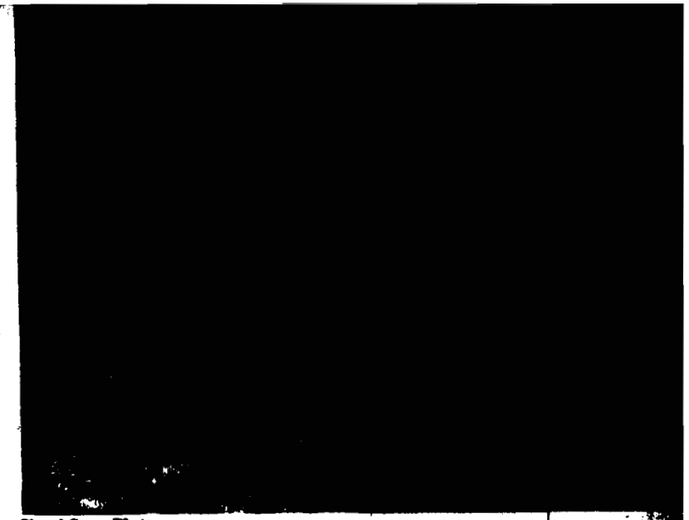
Orientation of War Correspondents

Arrangements were made immediately for the war correspondents to be briefed on the upcoming Leyte invasion. The briefing, although secret and "off the record," gave the correspondents a better understanding of the war story they were soon to cover. The newsmen then were furnished with a history of the division and biographical sketches of the division's general officers and regimental commanders. These the correspondents filed with their offices in advance.

In the days preceding the embarkation for Leyte, the correspondents were taken on an extensive tour throughout the division area and introduced to the various commanding officers and to the men. This later proved a great help in coverage.

During this time, and later aboard the transports en route to Leyte, the public relations staff had been writing advance stories on the soldiers who were to make the Leyte landing. These stories would be available for use after the landing, when it could be publicized that the 1st Cavalry Division was committed in the action. They included such information as what the soldier's job was with the division, what his personal feelings were about returning to the Philippines, and his complete home-town address.

For transportation, the public relations office had been allotted a jeep and a three-quarter ton weapons carrier, which were combat-loaded on the ships since they would be needed the moment the landing was effected.



Signal Corps Photo

A combat movie cameraman photographs a light tank of the 754th Tank Battalion firing at Japanese positions.

PROs Land With Assault Troops

On D Day, October 20, 1944, the public relations staff and war correspondents landed with one of the first three waves. (It is imperative that public relations personnel go ashore with assault troops, for news events are in the making and PROs can be of assistance to war correspondents.)

Each PRO member landed with a different unit, and immediately began gathering the routine "first" stories —who was the first soldier ashore, the first officer, who killed the first Jap, etc.? These stories were furnished the war correspondents in hand-outs. That night the PRO staff and the war correspondents slept in a hut on the beach.

On D Day plus One the 1st Cavalry Division's public relations office was set up in an old building on the road to Tacloban. Tables and chairs were provided for the correspondents, and rations were brought up in the weapons carrier.

On the night of D plus One, Major General Verne D. Mudge, division commander, held his first press conference. The conferences were continued almost daily thereafter, and did much to keep the Division in the news each day, and also won the favor of the correspondents.

The speed with which news moves determines much of its value; therefore one of a PRO's first considerations must be the establishment of a quick method for sending out the stories of war correspondents. In the Leyte campaign, the stories were delivered by a jeep messenger to a central station on the beach, and from there delivered by an LCM to a radio ship offshore from which they were flashed to the home offices of the correspondents.

On D plus Two, the public relations office was estab-

*Former 1st Cavalry Division Officer.

lished in the Leyte Normal School building in Tacloban. Some of the correspondents were quartered there, and others stayed in civilians' homes. All ate with the 1st Cavalry Division headquarters company.

A daily news hand-out on the military situation was written by the PRO, and distributed among correspondents. The best feature stories written by PR personnel were turned over to the correspondents, since copy filed by them always gets a better play in the states.

After leaving Tacloban, the PRO staff and correspondents lived in a tent, from which a messenger service for correspondents' stories was operated daily.

To operate effectively, a PRO must establish a working system; however, he must still plan moves ahead of time. When a big story is about to break, he must inform correspondents in advance, and arrange for the facilities they will need to cover it. And, to repeat, he must see that the stories are transmitted.

To illustrate, the commanding general of the Division received word on January 29, 1945, that the Division would move on Manila. This gave little time for arrangements, which were carried through as follows:

Coverage of the "Flying Column"

First, the war correspondents, who were at GHQ 60 miles away, were notified barely two days ahead of time that the Division would begin its race for Manila at midnight, January 31. Fourteen correspondents signified their desire to accompany the now famous "Flying Column."

The radio transmitter that would be used to send the stories out was located at the GHQ public relations office. It was necessary, therefore, to arrange for them to send a courier to the division's rear echelon, where he would pick up the stories that were sent back from the advanced echelon. En route, the division PRO operated in two separate sections. One of its jeep messengers, at one time, was traveling 75 miles to the rear echelon, and another the 60 miles from the rear echelon to the GHQ radio transmitter station.

On the way to Manila, Major General Mudge held a press conference each night to keep correspondents informed on the military situation.

When the city was reached a field artillery liaison plane was used to transport the radio correspondents, as well as the written stories of correspondents, to the transmitter at GHQ. The result was that news coverage on the 1st Cavalry Division beat that on other units by more than 24 hours.

The liberation of prisoners at the Santo Tomas University internment camp drew practically all of the war correspondents in the theater, and to these the division PRO was a host, whose duties included rationing and quartering them on the spot.

During this time the division public relations personnel, which had been increased to 5 enlisted men, were kept busy writing feature stories on the division and the men in it. Again the best feature stories were given the correspondents, and were invariably used.

News releases on every officer and man that entered Manila with the "Flying Column" were sent immediately to home-town newspapers, and because they were timely, got a pretty fair play. To get them out fast, troop clerks were pressed into service.

In addition to caring for war correspondents and preparing hand-out releases, the public relations section continually wrote stories about decorations and promotions. The stories behind the awards of the higher decorations were turned into general releases for the correspondents.

General PRO Problems

When publicizing any military unit, whether company or army, a public relations officer must slant his material for a possible use in all publishing media, and not concentrate his efforts on newspaper publicity alone. The other media are magazines, motion pictures, still photographs, radio networks and individual stations, and books. Magazines are on the lookout for feature stories about units which are built around one or two of its outstanding individuals; radio networks will use spot news, spot news features, and interviews with men who have done the unusual; motion picture and still cameramen always welcome any idea that will lead to good news or feature pictures; many war correspondents are writing books and will welcome material to include in them.

PROs should avoid "polishing the brass"; that is, spending a great deal of time writing about the high ranking officers in the unit. No story should be written unless it will stand up to a news or feature test. Only about 10 per cent of a unit is officers, and therefore 90 per cent of the releases should be about enlisted men.

In the 1st Cavalry Division the Public Relations Officer worked directly under the Chief of Staff as did other staff sections. This plan worked well, and apparently is the best. It puts the PRO on a par with the other staff officers, which is a decided advantage. A PRO should also have a separate office rather than working in one with some other section.

The biggest public relations problem is obtaining personnel. PR operates without a T/O, and personnel is obtained from other units on a temporary or attached basis. Once the value of a public relations setup is proven to the commanding officer, however, the needed personnel will be forthcoming. This is especially true while a unit is in combat.

There is no set of rules to follow in handling publicity for a unit, and a PRO must make his policies as the various problems present themselves. For this reason a policy book should be formulated for the section as work progresses; from time to time it will be of great assistance.

The reward to the Public Relations Officer for his work is the self-satisfaction that comes from seeing that his unit gets public credit for what it does in battle.

JOB TRAINING

*by 1st Lieutenant Walter J. Schweitzer**

THREE HUNDRED students are enrolled in on-the-job training courses at Fort Riley, Kansas. The newly inaugurated program is designed for the reëducation of men who have been away from their work for any extended period of time. A secondary purpose is to provide a sound foundation for further technical school training should an individual desire to take advantage of the education provisions of the GI Bill of Rights.

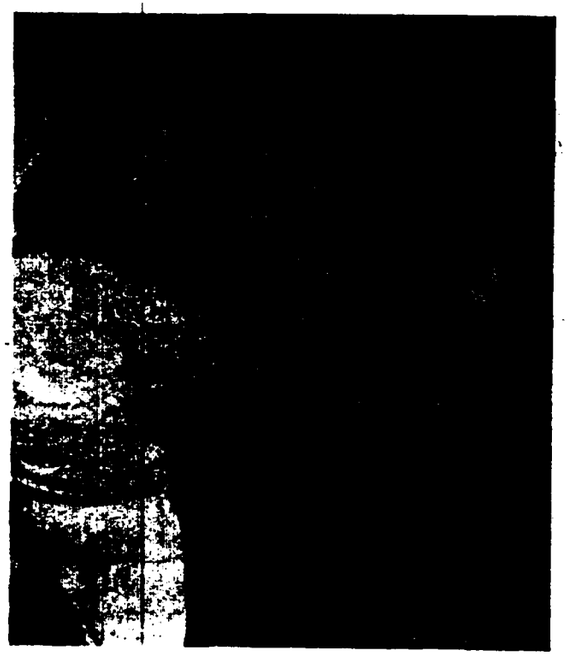
A board of officers has been organized for the purpose of coördinating the effort among the various departments of The Cavalry School, which has been called upon for instructors, material and its many other facilities that are available for instructional purposes. The board is headed by Lieutenant Colonel James F. Hollingsworth, of Fort Worth, Texas, who is assisted by Captain Jewett A. Dix, of Fort Lauderdale, Florida; Captain Lester B. Johnson, of Kansas City, Missouri; and Captain Albert W. Ackroyd, of Cuyahoga Falls, Ohio.

The new program offers 13 practical courses in:

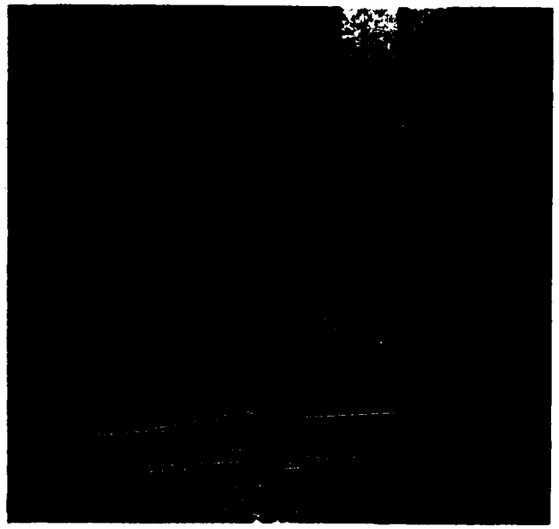
*Public Relations Officer, The Cavalry School.

Major General I. D. White, second from left, commandant of The Cavalry School, discusses the merits of the drafting course with students. On right, a warrant officer-instructor is helping student work out a problem in projection.

An education program to train soldiers for rôles in civilian life has been established at The Cavalry School and School Troops at Fort Riley, Kansas. Students attend voluntarily, and 13 courses are available, ranging from the intricate subject of radio maintenance to one for the equestrian.



Students check the circuit on a modern radio transmitter to locate shorts or breaks preparatory to making repairs.



Both electric and acetylene welding instruction is offered in the new educational program at The Cavalry School. An instructor watches as a student brazes a handwheel.

radio maintenance, auto mechanics, horsemanship, carpentry, painting, photography, drafting, printing, electrical work, plumbing, refrigeration, welding, and machine-tool operation.

Particular care has been taken to formulate a well-rounded course in refrigeration. Because of the coming emphasis in the postwar home on deep freezing, air conditioning and modern refrigeration, wide opportunities will be offered men trained in this field. The same can be said for the radio course, which embodies many related subjects, including radio operation, maintenance, electronics, television and frequency modulation. Regardless of the course chosen for study, the individual has available professional training and facilities seldom offered anywhere but in the army.

A study hall has been provided for students who desire to apply themselves beyond course requirements. It is shared by others who are enrolled in the multiple academic courses offered by the U. S. Armed Forces Institute. The courses taken by these students will enable them to receive a high school diploma, or better prepare them either for entrance into college or for work toward a college degree.

Many of the Fort Riley students are learning a new trade. The army is thus offering them a chance that to a civilian would be a gamble. As Corporal L. L. Stevans, of Marblehead, Mass., puts it: "The training offers a big advantage, for should anyone fail in any of the courses offered, he may change to another. As a civilian he could never afford to take that gamble."

As an example of how the courses are fitted to future jobs, students in the auto mechanics course work with various types of civilian vehicles rather than with army vehicles. In the printing course, a student sets up the type, makes the necessary adjustments on the press, and carries a press job through to completion.

Many prospective students are consulting 1st Lieutenant Richard C. Reidenbach, of Rochester, New York, Information & Education Officer and in over-all charge of the program, for advice on the courses offered.

A civilian instructor points out the function of the parts in a combustion engine to two students of auto mechanics.

ARMORED DIVISIONS IN WORLD WAR II

1st—"Old Ironsides"

The 1st Armored Division tasted heartbreaking setbacks in North Africa but fought on to a smashing victory. Later it went to Italy where it fought before Cassino, landed on the Anzio beachhead, and led the push to Rome. It kept on going over the Apennines to Bologna and Milan and across the Swiss border. It has been selected for occupation duty in Germany.

2nd—"Hell on Wheels"

With a total of 1,091 officers and 2,146 enlisted men with decorations, the 2nd Armored Division is proud of its combat service in the invasion of North Africa at Casablanca, the battle for Tunisia, the invasion of Sicily at Gela and the invasion of Normandy. It fought across France, Belgium, Holland and finally into Germany and occupied a section of Berlin after VE-Day.

3rd—"Spearhead"

"Firsts" claimed by the 3rd Armored Division are: first to cross the German border, September 12, 1944; first to take a German town, Roetgen; first to break the Siegfried Line (by Task Force "X"); and first to invade the "sacred" soil of Germany since Napoleon. The 3rd fought from St. Lô to Mayenne and Chartres, past Château Thierry to Mons, then to Liége and Aachen. Major General Maurice Rose, commander, was killed in action.

4th—"Breakthrough"

For relieving the trapped 101st Airborne Infantry Division at Bastogne, the 4th Armored Division and attached outfits received the Distinguished Unit Citation. In more than seven months of fighting, spearheading the fast-moving Third Army, the 4th Armored swept from Normandy to Brittany to Lorraine to Germany. It made a notable 120-mile run to smash Von Rundstedt in the Ardennes.

5th—"V for Victory"

Long drives of 300, 130, and 100 miles featured the overseas service of the 5th Armored Division which fought at St. Lô, Le Mans, the Seine, Compiègne Forest, the Moselle, and in the December "Battle of the Bulge."

6th—"Super Sixth"

Landing at Omaha Beach in Normandy in July, 1944, the 6th Armored Division helped open a liberation path from Brest to Bastogne along the road to Berlin. It fought at Avranches, Lorient, Nancy, Metz, Bastogne, Weimar, Jena, and Gotha.

7th—"Lucky Seventh"

A valorous stand by the 7th Armored Division in Holland saved the British-Canadian Antwerp campaign by stopping a strong German counterattack. This division fought at Château Thierry, Rheims, against Von Rundstedt at St. Vith, and sliced across Northern Germany to the Baltic.

8th—"Iron Snake"

First taste of battle for the 8th Armored Division came in the Moselle-Saar salient. The 8th went to the relief of the British "Desert Rats" at Roermond, Holland, crossed the Rhine on March 27th, 1945, and overran a number of German cities, smashing the 116th Panzer Division en route.

9th—"Phantom"

Called the "Phantom" by the Germans, the 9th Armored Division seized the Ludendorf Bridge across the Rhine at Remagen, a feat which shortened the war by months. The 9th fought at Bastogne, St. Vith, Limberg and Leipzig.

10th—"Tiger"

First division in the Third Army to enter Germany, to capture a major German city—Trier, and to stop the Germans at Bastogne during the Ardennes breakthrough, the 10th Armored Division bagged 30,000 prisoners and took 450 towns in five months of combat.

11th—"Thunderbolt"

The "Battle of the Bulge" had just begun when the 11th Armored Division landed in Normandy and reached the Bastogne-Neufchateau area by a forced march. Battles in Belgium, Germany and Austria followed. In these battles the First and Seventh German Armies were destroyed.

12th—"Hellcat"

The 12th Armored Division takes pride in its capture intact of the bridge across the Danube at Dillingen and in its 37-day drive in Bavaria, during which it conquered 22,000 square miles, captured 63,000 Germans and freed 28,000 persons, to clear a path from the Rhine to Austria.

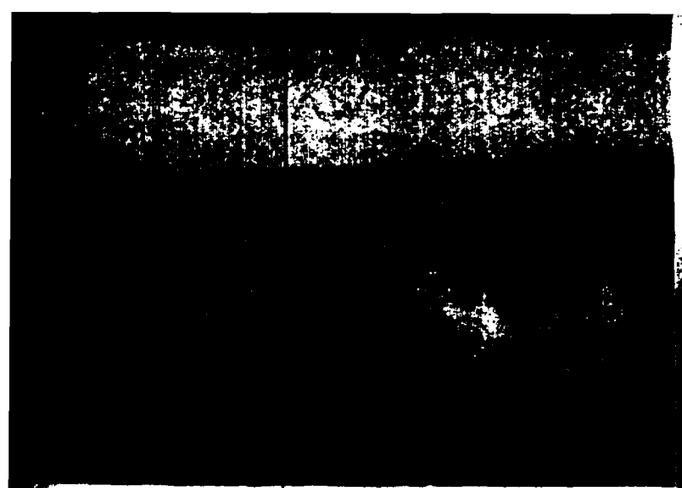
13th—"Black Cat"

The 13th Armored Division joined General Patton's Third Army in the closing stages of the drive to southern Germany, a surge that by-passed Berchtesgaden in the push to link up with the Russians. It crossed the Danube near Regensburg and was at Branau when Germany capitulated.

14th—Capturing 50,000 Germans, liberating 200,000 Allied prisoners, wiping out 450 German tanks and freeing 1,000 enemy-held towns, the 14th Armored Division drove 500 miles across the continent of Europe. It fought at Rittershofen, Neustadt, Schweinfurt and Moosburg.

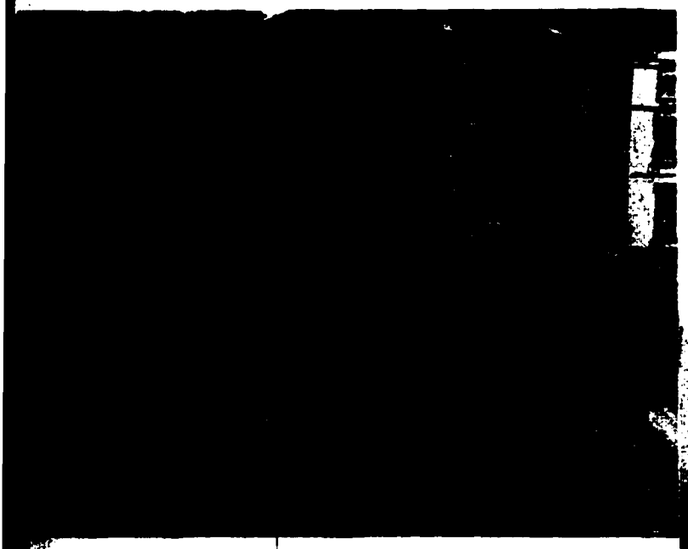
16th—Eight thousand prisoners per day—that's the average for the 16th Armored Division. But the 16th was in combat only one day, at Pilsen, Czechoslovakia, where it made the big haul. The war ended before the division could go on.

20th—Although only briefly in combat in Europe, the 20th Armored Division served well under the Seventh Army, aiding in the drive on Munich, the capture of Traunstein, and the smash into Salzburg where it made a prize catch of Nazi generals.



An M4 tank of the 1st Armored Division, Fifth Army, crosses the Arno River ford in the Cascina area in Italy, September 1, 1944. Note other tanks on roadway.

A 3d Armored Division tank machine-guns snipers in a woodland site while en route along the Autobahn that leads into Dessau, Germany.



A half-track of the 2d Armored Division, 41st Armored Infantry, is received by the joyous Belgians as the vehicle enters Soignies, Belgium, on September 12, 1944.

Tanks and other armored vehicles of the 4th Armored Division halt momentarily in the open, flat countryside on a roadway that is near Contheil, France in December, 1944.

THE NEW VETERAN. By Charles G. Bolte. Reynal and Hitchcock. $2.00.

Mr. Bolte was born in New York, grew up in Connecticut, and was graduated from Dartmouth in 1941. He did not wait for the United States to declare war on the Axis, but joined the British Royal Rifle Corps as soon as he received his diploma. He served a year in England, another in Middle East under Montgomery, fought against the North Afrika Corps and was wounded at Alamein.

On his return to the states he headed the American Veterans' Committee, made up of veterans of World War II. The Committee, which has as its slogan "Citizen first, Veteran second," has conducted a vigorous campaign against racial discrimination and has aligned itself with progressive groups.

The New Veteran is a coherent and intelligent presentation of the aims and ideas of a segment of our veterans of World War II.

In his first chapter Mr. Bolte quotes a statement made in 1920 by T. E. Lawrence: "We lived many lives in those whirling campaigns, never sparing ourselves any good or evil; yet when we had achieved, and the new world dawned, the old men came out again, and took from us our victory and remade it in the likeness of the former world they knew. Youth could win, but had not learned to keep, and was pitiably weak against age. We stammered that we had worked for a new heaven and a new earth, and they thanked us kindly, and made their peace. When we are their age, no doubt we shall serve our children so."

In a "Speech To Be Made After the War" the author explains why his own group joined the English army: "We went with no ideal of crusaders, without thought that we were fighting for a brave new world. There was no rosy-cheeked feeling in us of dying for an ideal, and little romance. . . . We felt we would be hard to disillusion, because we had no illusions.

"We had been well educated by honest books about the last war, and by parents and teachers who taught us that there is no good war, because in war no one wins. Then when this second war came, the war they had made inevitable by their refusal to accept the responsibility of having won the last war, they were distressed that we had absorbed their teaching, and called us weak, idlers and cowards.

"We reacted against their charges, and perhaps took longer to make up our minds than we would have taken if they had left us to do our own thinking. When we finally decided, when our convictions got the better of us—aided by our impulses, which had always been on the right side —we went.

"We didn't expect to like the army or anything about it. We went because the war was the big thing of our time and the soldier had again become the man who really moved things and decided issues: decisions subject to revision or even discard by politicians, by people at home, or by us when we were dog-tired of foreign countries after a foreign war; but nevertheless decision of the moment which soldiers alone could settle by force of arms."

In his explanation of the aims of his organization Mr. Bolte states:

"We are concerned with the military problem of security, the political problem of freedom, the economic problem of welfare, and the moral problem of justice. The problems are interrelated; their solution adds up to peace. But any easy dream of a brave new world will shatter, because there are too many concrete facts of existence and established order standing in the way of sudden change. Moreover, this country went to war because it was attacked by Japan and had war declared on it by Germany and Italy; if anybody is willing to fight for national survival alone, he is justified. But most of our allies are fighting for something better, and I think a lot of us are.

"The concept of a better world is not an idea or a dream: it is a matter of political necessity. . . . We can't expect everyone suddenly to become logical, and take the necessary steps over the obstacles which block the path to peace. I hope instead of deploring this fact we work with it and, like a good minority in a democracy, work until we make the majority change its mind and we in our turn become members of the new majority."

These excerpts give a general idea of the type of thinking to be found in this book. There are statements made which will not be concurred in by all readers, there are criticisms which may or may not be too harsh, but on the whole the book contains constructive rather than destructive ideology, well coordinated and well expressed. As an expression of the aspirations of a substantial portion of the new fighting generation, it warrants respectful attention and consideration.

THE CIANO DIARIES: 1939-1943. By Count Ciano. Doubleday, Doran. $4.00.

It is difficult to see why this important document should have been mangled and emasculated in the public press prior to its complete and unexpurgated publication. One can only hope that this premature release will not deter a large portion of the American public from giving careful attention to this important account of Italy's political and diplomatic involvement in the European imbroglio.

Count Ciano was one of those who distrusted Germany, but he was, to quote Mr. Wells in his excellent introduction: "The amoral product of a wholly decadent period in Italian, and, for that matter, in European, history. To him morality in international relations did not exist. He was wholly seized of the concept that only might makes right . . .", as a result he was unwilling actively to fight the dictator, although he consistently opposed Italy's entry into the war."

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THE CAVALRY JOURNAL

These diaries were undoubtedly written with an eye to publication, and it must be recalled that Ciano was at one time a writer on the staff of a Roman daily paper. There undoubtedly is much that they do not tell, and much that they do tell is so shrewdly worded that one phrase balances another.

The authenticity of these diaries is attested to in his excellent introduction by Mr. Wells, to whom Count Ciano showed them in 1940.

✓ ✓ ✓

WAITING IN THE NIGHT. By George Millar. Doubleday, Doran. $2.75.

Perhaps the most interesting stories of this war are those of the resistance movements kept alive in the European countries under German occupation. Underground workers were often recklessly brave, frequently foolish, sometimes unschooled in war, sometimes strong, at others unexpectedly weak. Their stories are often tragic, but never dull.

More than most *Waiting in the Night* brings out the human weaknesses of untrained civilians that must be overcome in order to coordinate successful armed resistance.

George Millar, an Englishman who had escaped from the Germans, was parachuted to France in June, 1944, to join the Maquis. He worked with several groups in the Besancon area, teaching the Maquisards the use of the firearms sent them, arranging for supplies, and directing sabotage.

His book is extremely well-written, and the characters who move through its pages become alive as he skilfully emphasizes their peculiarities and tolerantly views them as individuals with different natures, varied backgrounds, and distinct contributions to make to the cause of French liberation.

✓ ✓ ✓

FOUNDATIONS OF NATIONAL POWER. Edited by Harold and Margaret Sprout. Princeton. $4.25.

The editors of this book are the well-known authors of *The Rise of American Naval Power* and *Toward a New Order of Sea Power*. Harold Sprout is a professor of politics at Princeton University, but during the war he has devoted most of his time to the Navy Department, the War Department, the Department of State and the OWI.

The book is described as "readings on world politics and American security." Its introduction states: "The Second World War has altered profoundly the relations of the United States with other nations. Venerable foreign policies—such as neutrality toward European wars and avoidance of military alliances with foreign powers—require fresh appraisal in the light of changing conditions." The material has been culled from the statements of authorities on world conditions and political and economic history in order that the thinking American may be informed on the subjects pertinent to the nation's responsibilities in the world's new order.

THE BASIC MANUAL OF MILITARY SMALL ARMS. By W. H. B. Smith. Military Service. $5.00.

When the first edition of this extraordinary compilation of small-arms information was originally published, it was hailed as one of the most valuable books on domestic and foreign small arms. In its expanded edition it becomes even more important to the soldier, collector, manufacturer and designer as well as the non-expert interested in the subject.

Correlating information otherwise only obtainable in scores of manuals, many of them unavailable, this book was originally published to give our men in a single volume the material to enable them to identify and operate their own and captured enemy weapons. It should be included in every military library.

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The author was employed by Armstrong Vickers, by the Secretariat of the League of Nations as an arms expert, and is at present Consultant on Military Weapons to the National Rifle Association. He has brought to his task a thorough firsthand knowledge of weapons and a deep concern lest we allow our arms to stagnate as we did after the last war. In this respect the *Author's Note* should be carefully read.

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The form used is a loosely constructed blank verse which reads as prose but has a cadence that emphasizes the action described in an extraordinary fashion. The author's mastery of language is superb, and coupled with his perception produces a remarkable piece of literature.

Mr. Bowman not only has the ability to express human reactions, his observations of the animal and plant world surrounding him are equally keen and some of his best description is of the jungle and the sea. His adaptation of army orders and instructions to the half-bantering, half-bitter thoughts and words of the character is exceptionally skillful.

The book is not without its faults. There is occasional wordiness—probably the result of the novel style used—and a tendency to force epigrams and metaphors, but these weaknesses do not materially detract from the fact that this narrative is a brilliant piece of work by a young man whose literary career should be watched.

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A RIBBON AND A STAR. By John Monks, Jr. and John Falter. Henry Holt & Co. $2.75.

ON TO WESTWARD. By Robert Sherrod. Duell, Sloan and Pearce. $3.00.

A Ribbon and A Star by the author of *Brother Rat* is the account of one small segment of a campaign. The material has been drawn from personal experience, and in spite of a tendency on the part of the author to dramatize his characters, moves with a swift clear realism. The illustrations by John Falter are excellent sketches done with a fine appreciation of the importance of good craftsmanship.

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FIGHTING DIVISIONS. By CWO E. J. Kahn, Jr. and T/Sgt. Henry McLemore. Infantry Journal. $2.50.

It is difficult to weigh the value of this compilation of thumbnail sketches of the records of combat divisions in World War II. Limited to this war's exploits, the book is valueless as a history of the divisions, and the sketches are too concise to even give a full account of recent activities. As a 25¢ pocket pamphlet it might have a very slight reference value for refresher purposes but it does not warrant the fine format given it.

SOLDIER OF DEMOCRACY. By Kenneth S. Davis. Doubleday, Doran. $3.50.

Biographies of living men are generally written by two types of authors—those so enamoured of their subject that they are completely blind to his faults, or so bent on the destruction of a character that they will grant him no virtue. In his biography of General Eisenhower, Mr. Davis obviously falls into the first catagory. It would be illogical to expect a dispassionate and objective picture of a popular war hero at this time. Actually, Mr. Davis has done as good a job as could be expected. He has given the general public a great many personal facts that will help to make this dominant war figure more of a human being. But he has done his idol a disservice in making him too perfect, and in attempting to forestall any criticism of certain actions of questionable wisdom by tossing the blame into the air and allowing it to fall anywhere so long as it does not touch the General.

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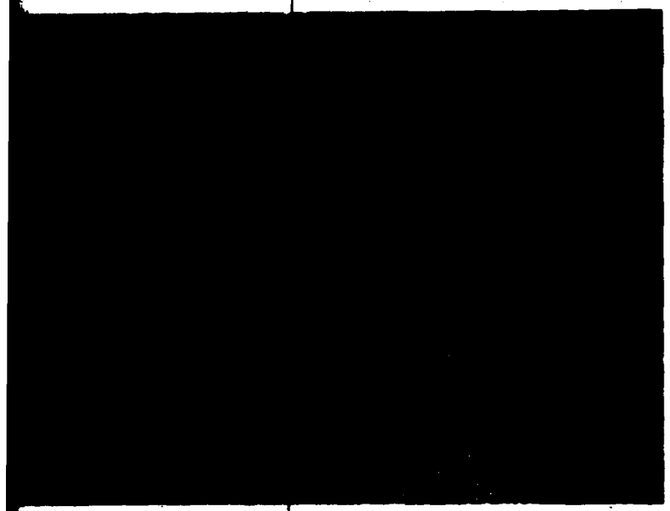
The Infantry-Tank Team in Jungle Operations

by Lieutenant Colonel Wilbur C. Strand



In mutual support, members of the tank-infantry team are shown advancing as troops crouch low behind tank.

(This article was written in March, 1944, while the author was serving with the XIV Corps on Bougainville, Solomon Islands. It describes the methods of infantry-tank employment in jungle warfare which were developed in the XIV Corps by combined infantry-tank training and combat experience. Some of the tactics and expedients which are given are unorthodox, but the limitations imposed on tanks by jungle terrain required answers that were not in any book at that time. This article was not published in 1944 because of security restrictions. Recently these restrictions were removed and the article is now published because it clearly describes practical and realistic solutions to the problems of tank employment in jungle warfare. The success of the infantry-tank teams of the 37th and Americal Infantry Divisions and of the 754th Tank Battalion in their stubborn and prolonged defense of the Torokina Beachhead on Bougainville is ample proof of the soundness and value of the methods described in this article.—Editor's Note.)

Photos by Signal Corps

BY decisively defeating the Japanese in many local actions, infantry-tank teams proved their ability to operate in the jungle terrain of the Pacific Islands.

The following observations governing their employment are a result of training and combat experience based on careful consideration of the capabilities of tanks and the limitations imposed upon them by jungle terrain.

1. Tanks must be employed only over terrain suitable for tank movement and against definitely located enemy resistance.
2. Infantry-tank attacks in jungle terrain are normally for limited objectives only; therefore, the plans must include measures for rapid reorganization of all objectives.
3. The fire power of the tank assumes great importance in the jungle because of the limitations on maneuver and shock action. Therefore, whenever possible formations must have a maximum number of tanks in line to exploit their fire power.
4. To facilitate control, tank formations must be very simple. Wherever possible tanks must be carefully placed in attack formation behind the line of departure.
5. The infantry-tank attack requires maximum fire support by infantry and artillery weapons, both before and during the attack.
6. Advances must be by short bounds with frequent short halts for reorientation and reorganization.
7. Tanks must be employed in mass, not piecemeal, and in sufficient strength to insure continuity of effort.
8. Tanks and infantry must develop perfect teamwork: the tanks must provide accurate, direct fire against resistance holding up the infantry advance; the infantry must provide close-in security for tanks during their approach, attack, and withdrawal.
9. Constant communication between infantry and tank commanders must be maintained.
10. Maximum use must be made of bulldozers and engineer equipment to assist movement of tanks in jungle terrain.

Formations

The basic unit of the infantry-tank team is comprised of one platoon of tanks and one platoon of infantry to which are attached certain engineer specialists. The team operates in three echelons. First, an assault wave of three tanks; second, a support wave of two tanks, each of which is followed closely by an infantry squad with attached engineers; and third, the platoon reserve which contains one reserve tank and the remaining foot troops.

Around this basic unit, suitable company and battalion formations can be built up by employing infantry-tank teams in line, in column, or in echelon. In order to exploit the full fire power of the tanks, to maintain direction, and to prevent tanks from endangering each other by their own fire, whenever possible the team's advance should be made in line. Since combined operations of infantry and tanks in the jungle are inherently complicated, every effort must be made to keep formations as simple as possible.

Because of the extremely poor visibility in dense jungle undergrowth all distances and intervals must be greatly reduced, at times to as little as 5 or 10 yards.

Communications

Constant and adequate communications are necessary within the tank and infantry units as well as between them. Many methods have been used to provide it, but best results have been obtained with the following:

Infantry company commander to infantry platoon leaders—by sound-powered telephone or runner.

Infantry company commander to tank officers—SCR 510, to SCR 508 in tanks.

Infantry platoon leader to infantry squad leader—SCR 536. A radio operator carries the radio and passes orders to the squad leader, who is thus free to direct operations of the tank and infantry under his immediate control. Runners are used if radio communication fails.

Infantry squad leader to tank commander—An EE8A telephone is placed inside the tank turret and a regulation flashlight is strapped in a position conspicuous to the tank commander. A 20-foot length of 4-strand electric cable is extended from the phone box inside the turret to the rear of the tank. At the end of the cable is attached an EE8A telephone handset. The butterfly switch on the handset is modified so that when pressed it will complete a circuit through one channel of the cable, and light the flashlight and attract the attention of the tank commander. Telephone conversation is then held over another channel of the cable. The use of the flashlight makes it possible for the infantry to signal the tank commander in spite of the noise of battle and the noise in the tank. The assistant squad leader carries the telephone handset and passes information from the infantry squad leader who directs the fire and movement of the tank.

Infantry platoon leader to tank platoon leader—The most satisfactory means of contact is an EE8A telephone combination. Another method is by SCR 536 to the reserve squad, thence by radio from the reserve tank to the tank platoon leader.

Somewhere in the Pacific: Dead Japs attest the success of the infantry-tank team in combat in the jungles.

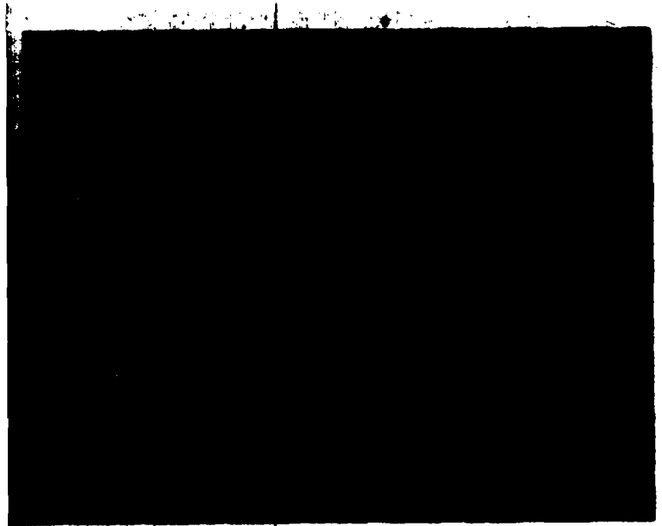
Engineer officers—The engineer officer is equipped with a SCR 593 (receiver) to keep abreast of the situation. He communicates with the Company CP by runner.

Target Designation

Tanks are almost blind in thick jungle and for that reason infantry squad leaders must designate to tank commanders obstacles to avoid and targets to fire on. Since enemy pillboxes and positions are extremely well camouflaged, target designation is difficult. Tracer fire for the designation of targets to tanks in the jungle is unsatisfactory. The use of colored smoke grenades proved most successful. It was found that fully charged grenades produce too much smoke and obscure the target. However, if the grenade fuze is unscrewed and half the charge removed an adequate amount of smoke is produced. To obtain a longer range, projection of the grenade from a rifle is desirable. The best results are obtained by arming the rifle grenade before firing since this produces a trail of smoke to the target.

Advance Preparations

An early and thorough reconnaissance by infantry, tank, artillery, engineer, and communications officers is essential. Detailed reconnaissance is necessary in order that all commanders concerned may formulate a mutual plan of action.



A tank-infantry team protects organization of a newly won position; second man, left, talks to tank by phone.

Routes of approach—If suitable routes of approach for tanks do not exist, they must be prepared by the engineers.

Natural obstacles—The jungle contains many natural tank obstacles such as swamps, dense forest and undergrowth, precipitous slopes, coral or volcanic ridges, and numerous streams. Engineer troops must assist tanks by clearing trails and improvising bridges or crossings in swampy terrain. Medium tanks can operate through very thick undergrowth which contains small trees and matted vines, but they must detour around large trees, stumps, and fallen logs which are more than two feet high.

Minefields—It must be anticipated that the enemy will employ minefields and antitank guns to cover likely avenues of approach. Preliminary reconnaissance must be thorough to avoid the use of tanks over mined areas. If an attack is to be made over such an area, the mines must first be removed, either after the use of mine detection apparatus under cover of darkness or smoke and heavy protective fires, or by mortar or artillery fire, bangalore torpedoes, or prima cord.

Tank Park—It will be necessary to establish a tank park near the main supply routes. It should be protected from hostile artillery or mortar fire, if possible, and secure from enemy raiding parties. Dumps of fuel and ammunition should be established and facilities provided for the repair and maintenance of tanks and ordnance.

Reservicing Point—This point must be located conveniently near the zone of action. Normally two units of fire and one refill of fuel should be maintained at the reservicing point. Emergency maintenance crews also should be present.

Attack Position—This is an area close behind the front line where the tanks carefully deploy in their attack formation, and where the infantry and engineers take position in the formation, and final instructions are given. Here timely coördination with front line units must be effected and information on additional targets obtained. Normally not over 20 minutes should be spent in the attack position because excessive delay may warn the enemy of the impending action. Selected routes from the attack position to the line of departure must be reconnoitered in advance and marked with guides or tape.

Rally Point—The rally point may be the attack position, the reservicing point, or some other designated area. Plans must be made for emergency maintenance crews to meet the tanks at this position where, after an attack, the tanks are reorganized and reserviced. Casualties should be evacuated from this point and disabled tanks towed back to it.

Reserve Tanks—One tank company should not make more than two sorties during a day's action in the jungle. If action is to be longer, a reserve tank unit should relieve the original unit.

Supporting Fires—Prior to the attack, heavy concentrations of artillery fire are essential, but should be withheld until after reconnaissance has been completed. This will permit reconnaissance parties to operate with greater concealment, since artillery fire destroys jungle growth. After all reconnaissance has been completed and before the tanks leave the tank park, a heavy artillery concentration should be placed on the enemy positions. Shells must not be fuzed for tree bursts, because heavy limbs will be torn down and hinder the advance of the tanks. Bursts which demolish undergrowth are especially desirable, for enemy pillboxes are more easily spotted when shorn of screening vegetation. As the tanks approach the front lines, artillery fire should shift to the enemy rear but remain at maximum intensity so that the noise covers the sound of the approaching tanks. In general, infantry support weapons conduct fires by normal methods.

Conduct of the Attack

Advance—The infantry-tank team line moves forward at a slow rate. It is the duty of the tank company commander to keep the advancing tanks in line; and all commanders must be particularly careful to prevent tanks from firing on each other or on friendly troops. During counterattacks an infantry officer or NCO from the immediate front lines should ride in each assault tank and indicate to the tank commander the positions held by our troops and any known enemy.

The infantry-tank team in action—The team goes forward in three mutually supporting echelons or waves. The mission of the assault tanks, which advance slowly, firing cannon and machine guns at close range, is to gain fire superiority over the enemy, to force him into cover, and to clear out jungle growth so that enemy pillboxes may be seen. If a target is located, the tanks destroy it with cannon and machine gun fire.

In thick jungle, the two support tanks of the team advance along the tracks made by the two flank tanks of the assault wave. The mission of the support tanks is to knock out pillboxes and entrenched enemy which have been by-passed by the assault tanks, to cover the assault tanks, and by canister and machine gun fire prevent the enemy from approaching the tanks to disable them with mines or incendiaries. Support tanks designate targets to the assault tanks by radio-transmitted messages coördinated with smoke grenades thrown by the infantry. They also destroy snipers in trees with canister fired into tree tops, or with AP and HE fired into tree crotches.

The mission of the infantry squad in rear of each support tank is to locate enemy pillboxes and intrenchments and to designate these targets to the tanks by throwing or projecting colored smoke grenades onto them and by giving the appropriate directions to the tank commander. The squad also destroys by fire any enemy seen above ground, especially those who attempt to swarm over the tanks and damage them. In addition, it searches all holes and pillboxes which have been passed over and destroys the enemy therein with flame throwers, grenades, or explosive charges. Particular attention must be paid to enemy who feign death.

The mission of the team reserve is to repel enemy counterattacks; it also provides a reserve for replacing damaged tanks. Reserve tanks may be employed to knock out by-passed pillboxes or to fire on snipers. The enemy on the flanks may withhold fire until the assault tanks have passed and then deliver flanking fire on the infantry and the tanks. Infantry squad leaders, therefore, must make every effort to locate enemy positions and to direct the fire of the tanks toward them. To facilitate this, tanks and infantry should cease firing for short periods.

The infantry platoon leader must decide when to cease fire, and give the necessary orders. He must be well forward and in a position between his two advance squads to enable him to keep fully abreast of the situation at all times, and maintain adequate control. He must be accompanied by two or three riflemen who precede him for close-in protection, and a radio man to operate the SCR 536.

Organization of Captured Ground

When the objective is reached, the tanks halt and fire with all available weapons at definite targets or places of likely enemy approach or concealment. The infantry squads of the assault teams and the company support team should immediately push forward to the rear and flanks of the tank line and construct a hasty defensive position.

If the attack formation employs a company of tanks with a company of infantry (i.e., three infantry-tank teams in line or in echelon), a reserve reinforced company of infantry should follow up and construct the defensive position. The standard procedure of emplacing automatic weapons and mortars, or organizing the ground, digging in, and putting out protective wires should be used. Prepared concentrations for use in the defense may be carried into action on the rear decks of support tanks.

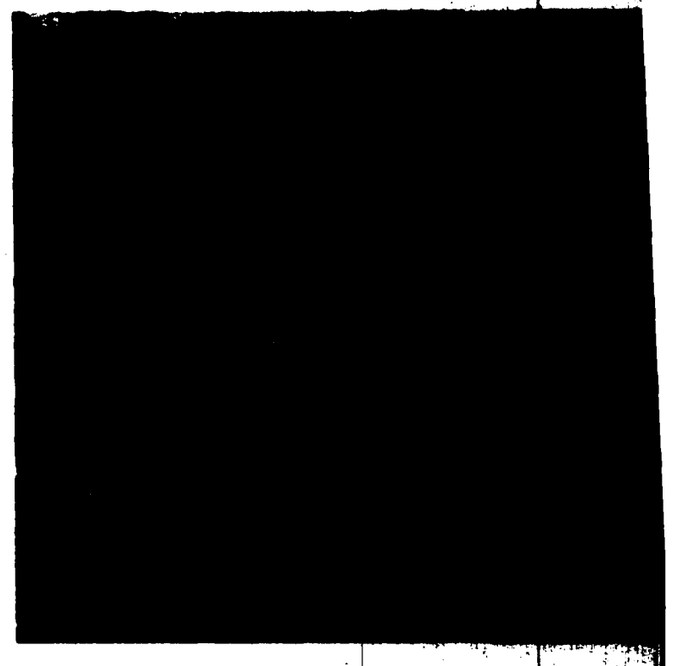
No guns should be emplaced or wire laid in the lanes made by the tanks as they advance in the attack. After the defensive position has been organized, the tanks and their protecting squads should withdraw over the original routes of advance. In turning about to withdraw, all tanks, if possible, should turn to the right about. Such a standardized procedure will enable the protecting squads to clear the danger space without confusion and subsequent loss of time. Before withdrawing, tanks must reverse their turrets and keep their guns trained in the direction of the enemy because enemy antitank guns silenced in the action may be remanned in time to fire on them as they withdraw. After the tanks have retired, the lanes are closed with concertina wire.

Special attention must be given to strengthening the flanks of the salient. To insure that no enemy are feigning death, the infantry must minutely investigate all ground within the salient and search all positions for personnel.

Use of Screening Smoke

Visibility in the jungle is so limited and observation so essential in the infantry-tank attack that the use of

Infantrymen mop up a position with rifles and grenades.



A light tank and supporting troops advance under fire.

screening smoke is not normal. If a minefield exists in the line of advance, however, smoke screens may be used to conceal the ground troops who remove the mines. Smoke should be used early enough to allow it to dissipate by the time the attack is launched. At the end of the attack, a smoke screen may be utilized to cover the withdrawal of the tanks and to mask from the enemy the digging in and wiring operations of the infantry as a defensive position is constructed.

Special Missions

Often tanks are employed individually or in small groups of two or three to reduce an isolated strong point which cannot be overcome by artillery or mortar fire, nor taken by infantry assault without undue cost. In such instances the enemy position must be located and a feasible route of approach to it reconnoitered. The tanks should move over the selected route to the position under close guard by a detail of infantry. The attack may be launched with a combination of infantry-tank tactics, of the position may be reduced by short-range direct fire by the tanks. Fire by canister and machine guns will frequently tear away undergrowth or camouflage and permit the gun ports of pillboxes to be seen. HE shells can then be fired into the openings. Tank-mounted flame-thrower fire may also be used effectively. Where no openings appear, AP shot will frequently make a breach in the pillbox through which HE can be fired.

At times enemy snipers armed with rifles or LMGs climb trees overlooking our lines and deliver plunging fire into our positions. Where they are too close to be dislodged by tree bursts of mortar shells, tanks are effective in dispersing or destroying them. Usually they are never definitely located. Canister and machine gun fire delivered into suspicious looking tree tops and AP shot fired through the boles of trees at suspected sniper perches will usually silence such enemy fire.

Single tanks are sometimes employed as mobile pillboxes to secure avenues of approach into our positions or to protect newly won vital installations until proper defenses can be organized. Tanks must always be protected by infantry when used for such purposes.

Small groups of tanks and infantry may be employed to make a feint on an enemy position in order to divert attention from another operation, such as the recovery of wounded.

Training the Infantry-Tank Team

The success of the infantry-tank team depends on intensive, thorough, combined training, sound planning, and aggressive execution. Reconnaissance of training areas must be made by both tank and infantry officers prior to any field work. Areas selected must conform to the particular phase of training being emphasized. The training program should begin with conferences on technique, formations, and mutual coördination. Large sand-table models representing actual terrain to be operated over are excellent for demonstrating team formations. Extended order drill in open terrain is an important preliminary step in familiarizing both infantry and tank personnel with formations to be used. Tactical problems that will be met in the jungle should follow, beginning with the smallest infantry-tank unit and progressing to company and battalion attack problems. Extensive use should be made of blank and live ammunition, dummy pillboxes, explosive charges, smoke, and other expedients which will render the training realistic. Special observers should watch attacks from enemy positions in order to spot weaknesses in technique.

A flame thrower is used to mop up a by-passed position.

Signal Corps Photo

Experienced troops on patrol in Luzon are shown taking full advantage of the terrain for concealment.

PATROLS IN THE JUNGLE

PART I

(The following article has been condensed from a Training Memorandum prepared by Headquarters I Corps. Although it is to be noted that some modifications are recommended for scouting and patrolling in the jungle, the basic principles outlined are almost identical with the instructions given in War Department training manuals, which have been SOP for years.—Editor's Note.)

UNDER the conditions that exist in jungle warfare, in which visibility usually is restricted and terrain tends to canalize activities, orthodox patrol formations often must be modified or abandoned entirely for new ones. Nevertheless, when all of a theater of operations is not jungle, the use of normal patrol formations should be utilized when conditions permit.

Basic Considerations

Patrols are employed for a number of missions, the most important of which are: to gather information (reconnaissance); to protect other troops (security); and to harass or raid the enemy (combat).

Other basic considerations which govern the operation of a jungle patrol are its size, the assembly points and objectives, maintenance of direction, chain of command, rate of march, and equipment.

To these should be added the general realization by the commander who sends it out that the patrol's mission must be simple and definite. A single patrol cannot execute involved missions efficiently. It is better to use a number of patrols, each with a single mission.

Size of Patrol—Generally depends upon: (1) The mission it is to perform. (2) The distance it will operate from friendly troops. (3) The length of time it will be out. (4) The number of messages it may be required to send back.

Combat missions ordinarily require stronger patrols than reconnaissance missions, although the latter may

have to fight at times in order to obtain information. Patrols that operate at considerable distances from friendly troops must be stronger than those used for close-in work, because of greater danger from attacks and need for more equipment such as radios. The longer a patrol is away from its unit, the greater its requirements will be for messengers and equipment.

Patrols larger than a squad are harder to control and to conceal, tend to be more noisy, and usually make slower progress, but can send back messengers more frequently without loss of effectiveness.

When the area is reached where detailed reconnaissance is required, effective use of patrol personnel can be made by establishing a central base of operations and sending out a number of two or three man patrols from there. When time is short and a large area is to be investigated, this method is especially useful and the size of the patrol will be determined on this basis.

In general, use the least number of men to accomplish the mission, with due regard to safety, available time, and message requirements. For jungle operations no patrol should consist of less than three men. This number may be regarded as a basic *jungle scout team.*

Assembly Points, Objectives—Patrols should have a designated assembly point at which every member can reassemble in case of dispersal through ambush or surprise attack. Members of a dispersed patrol should endeavor to reach this point with all possible speed in order to facilitate resumption of the mission.

The patrol should progress from one designated objective to another. When the first has been reached, the patrol is halted and a new objective and assembly point named. New assembly points should be selected which afford concealment in the vicinity of the objective just reached. This will enable the patrol leader to point out the exact spot on the ground before the patrol proceeds to the next objective.

Maintenance of Direction—A patrol maintains direction when possible by marching on prominent terrain features. If there are none, compasses must be used. Each patrol must carry at least two, one for the leader, and one for the second-in-command in the rear, who guards against any deviation from the proper course. A qualified member of the patrol should serve as map man. He will know the patrol's location at all times and assist the leader to maintain the proper direction.

Rate of March—The leader must calculate in advance how fast he must move in order to accomplish the mission in the time allotted. The rate of movement will vary, depending on differences in terrain, proximity of the enemy, time of day, and the amount of detailed observation which is required. Patrol members should know each objective and the time required to reach it.

The rate of movement ordinarily necessary to complete the mission on time will not permit slow advances by creeping and crawling, or by successive short rushes by individuals. On terrain where good cover is available, however, but which is known to be under enemy observation, to avoid giving away the location of the patrol or sustaining losses, open spaces of 300 yards or less may be crossed by creeping and crawling. The same method of approach may be made when close to enemy positions, or to exposed observation points near the final objective. Except in combat, patrols do not advance by short rushes; time does not permit it. In crossing open ground the longer the patrol is exposed the more danger it is in. In general, reliance should be placed on the security groups while the patrol advances at the normal rate. When a patrol reaches the edge of an open space that cannot be avoided it should preferably be halted under cover while the point rapidly investigates the cover on the opposite side. Upon signal from the point that the cover ahead is not occupied, the patrol resumes its advance at the normal rate.

Equipment—A patrol should travel light to reduce fatigue but sufficient equipment must be carried to insure effective action. In the jungle, machetes are needed to cut trails, entrenching shovels are useful if combat develops. Compasses are invaluable for maintaining direction, and a pair of field glasses and a watch should be made available to the patrol under any terrain conditions. Rations are carried only on long missions and then in minimum amounts. Ammunition needs are anticipated and issue made accordingly. Personal equipment taken by patrol members must be checked to avoid carrying excess weight. Individuals must carry tablets for chlorination of drinking water if the patrol is to be out for more than 12 hours. A radio should be taken if the mission indicates its necessity.

Characteristics of Patrol Formations

Patrol formations are not hard and fast arrangements of personnel in the same manner as are squads in close-order drill. They are fluid and flexible, and permit the individual patrol members to take full advantage of cover and terrain. The formation in use by the patrol at any one moment should be naturally adapted to that particular piece of terrain. It should be developed by the patrol members on order from the leader, and based almost entirely upon their ability to see each other and at the same time make full use of cover and concealment. After deciding what formation will be used, the patrol leader conveys his decision to the patrol by signal, and members of the patrol change their relative positions to conform.

Within the designated formation, points and flank groups will move in and out as required in order to observe any cover up to 100 yards that might harbor an enemy. Their movement, however, must not be made in such a manner that it will prevent the inside man from maintaining visual contact with the patrol leader. In general, the lateral movement of flank groups will be limited to 100 yards from the line of advance.

The selection of suitable formations for different kinds of terrain, time and weather depends entirely upon the factor of visibility. When visibility is poor,

contact between patrol members can be obtained in normal terrain by the use of the skirmish line, wedge or column formations. When it is good, contact between members is facilitated, and in normal terrain, the diamond, or line of half squad column formations are suitable. In jungle terrain at any time and in any weather, column formations are required.

Two things determine the leader's position:

1. If a clearly defined route can be prescribed in advance so that the leading scout can follow it, the patrol leader may be located anywhere within the patrol where his signals can be readily seen by individual members.

2. If the route cannot be definitely prescribed, the patrol leader must be in the leading group.

On well-defined trails loss of leaders will be reduced if they are located back of the point. When the route is not clearly defined, speed of movement will be slow unless the leader leads his patrol.

All members of a patrol should be regarded as potential "get-away men" and should understand that they are to return to headquarters only when ordered to do so by the leader, or when the patrol has been dispersed and no one else reaches the assembly point.

Security

During movement as well as during the halt, provision must be taken for all-around security. Most formations provide for this, if members conduct themselves properly. While in motion, flank groups move in or out and investigate possible enemy positions adjacent to the route. On jungle trails, these flank groups may be unable to leave the track, but are nevertheless responsible for observation of their assigned flank. In normal terrain, any cover for an enemy up to 100 yards on the flanks must be observed by a movement of the flank groups to it.

A two-man flank group operates as follows: The man nearest the center of the patrol, while remaining within a maximum distance of 100 yards away, determines his position on the basis of visibility, since he must keep the patrol leader in sight at all times. The man farther out remains in sight of the inside man, but normally does not go more than 20 yards away.

While investigating a woods, the inside man moves along its outskirts while the outside man penetrates into it as far as possible without losing sight of the inside man. The two, however, should not be separated in most cases by more than 20 yards. When traversing a ridge the inside man stays on the side toward the patrol while the other man investigates the other side. In so doing, he maintains contact with the inside man, but avoids the skyline.

The rate of movement of the leading group must be slowed down at times to permit the flank groups to cover the greater distance they have to travel. In order that the entire patrol will not be endangered, the leading man of a point group rapidly moves forward as the patrol approaches a ridge line or thick cover that might harbor enemy troops, and he slows down and permits the remainder of the point to catch up on the down slopes where the cover is thin. Approaches to crests and dangerous areas are made as carefully as possible to avoid enemy detection. The rear group moves rapidly from point to point where observation is good while maintaining a maximum distance of about 100 yards from the center of the patrol. During their movements, front and rear scouts must not lose sight of the inside man of their group, who is in visual contact with the patrol leader. At least one man of all groups maintains a position from which the leader can be seen and his signals recognized. Individual members of a patrol adapt themselves to the requirements of terrain and visibility within these general limitations.

Should an important terrain feature be situated too far from the selected route of the patrol to permit investigation by a flank group, the leader should change the course of the entire patrol to cover it, particularly if it is of tactical value to the battalion or regiment. The entire patrol may traverse the feature or only the flank group, depending upon its size and importance. Such deviations from the selected route of a patrol are necessary maneuvers, and the patrol's actual route while maintaining its general direction will weave back and forth across its direct line of march, in accordance with the needs for flank observation and protection.

March Outposts

Automatically, and without exception, when it halts in enemy territory a patrol must establish a march outpost. The arrangement should provide for all-around protection. The mechanism of establishment follows:

1. The point, flank groups and rear point first halt in place.

2. Each group moves forward, to the flank or to the rear, far enough to permit them to see over or around or into cover which might harbor enemy groups. In no case, however, should the distance exceed 100 yards from the center of the patrol and, in the jungle, it will not normally be more than 50 yards.

3. While one man remains where he can see the patrol leader, the other man or men in the point or flank group move not more than 25 yards farther out. Members of the patrol remain in observation during the halt and take their former positions when movement is resumed. During short pauses of a minute or less when the patrol has halted for observation the patrol members remain in place, but when a longer halt is indicated the march outpost should be set up at once without command. It should be remembered that in normal terrain, if the flank groups are doing their work properly, they should be already in approximately correct position for the march outpost. If in the jungle, they move to the flank to the usual limits based on visibility.

(*Formations adapted to jungle terrain and to normal terrain will be described in an article to appear in the next issue of* The Cavalry Journal.)

Cavalry Reconnaissance

In the Solomon Islands

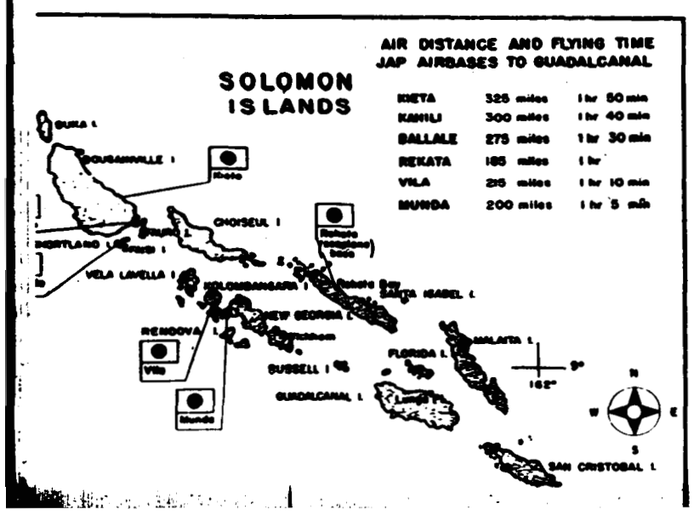
by Lieutenant Colonel E. C. D. Scherrer

During the New Georgia campaign the author, a Cavalry officer, Lt. Col. (then Captain) E. C. D. Scherrer, now an Instructor, Department of Tactics, The Cavalry School, was selected to direct and coördinate provisional reconnaissance patrols and the South Pacific Scouts. Lt. Col. Scherrer was awarded the Distinguished Service Cross and the Purple Heart with two Oak Leaf Clusters for his performance of duty in New Georgia.

AT dawn on June 30, 1943, in the South Pacific Theater of Operations, the third phase of the American offensive against the Japanese Imperial Forces began. The first and second phases had already been completed.

The first test of Japan's armed might began on August 7, 1942, when elements of the 1st Marine Division under command of Major General Vandegrift landed at Lunga Point on Guadalcanal Island on near-by Tulagi. From then until the end of the campaign on February 15, 1943, Guadalcanal was a vast rat hole down which were poured the lives of an estimated 42,500 Japanese soldiers, in a futile effort to prevent the American forces from gaining a foothold in the Solomon Islands.

The occupation of the Russell Islands, lying about 40 miles to the north and west of Guadalcanal, was carried out unopposed by the 43d Infantry Division in the early days of March, 1943. The second phase of the offensive was under way. Objective: complete local mastery of the air.



Because of their strategic position between Guadalcanal and Japan's air bases to the north, the Russell Islands figured prominently in this plan. At those bases were bred and born frequent bombing missions intended to prevent consolidation of our Guadalcanal positions. Russells-based fighters frequently were able to break up enemy bomber formations headed for vital shipping in the thriving roadstead off Guadalcanal.

Japan's last mighty air blow at this target was delivered June 7, 1943. Of a force of 120 Nip dive and torpedo bombers and fighters, 94 were shot down. The action cost us six aircraft, from which two pilots were rescued. Damage to our shipping was slight. Never again did the Japs risk sending aircraft in numbers south of the Russells. They resorted to ineffective hit-and-run raids which did nothing but arouse the ire of the doughboys who had to stay awake and alert during all *condition red* periods. The Jap was to pay off for that loss of sleep in days to come.

The second phase was finished. Our mastery of the local air was complete.

The third phase was an offensive aimed at the heart of Japan's outer ring of island defenses at Rabaul, New Britain. The first step was of necessity the neutralization, occupation, and conversion to our own use of the enemy air bases at Munda, New Georgia, and Vila, Kolumbangara. With these bases in our hands, air cover could be provided for the acquisition of islands and the construction of additional bases even farther to the north. New Britain itself had to be hit.

Preliminary reconnaissance of New Georgia and surrounding small islands was carried out over a period of weeks extending from the end of the Guadalcanal campaign to the beginning of operations on Rendova Island, six miles from Munda, in the early dawn of June 30.

Available for the initial assault on Rendova Island, from which artillery support could be given operations on New Georgia, was a task force designated as "The New Georgia Occupation Force." It consisted of the 43d Infantry Division, the 37th Infantry Division, attached Marine units, and special units of both Army and Navy including naval construction battalions for the construction of airports. The 43d was located on the Russells and the 37th was on Guadalcanal where it had relieved the Americal Division on May 1.

The original plan of action directed that the 43d Division take Rendova Island (lying south of New Georgia) and adjacent small islands, to use as supply bases and staging areas to New Georgia proper. Simultaneous landings were to be made at Segi Island off the southern tip of New Georgia where an airfield was to be immediately constructed to render local fighter support. Jap positions at Rice Anchorage and Enogai Inlet on the northern shore of New Georgia were to be taken by the Marines plus attached infantry units from the 37th Division. These troops were then to establish a trail block south of Bairoko Harbor, also on the north shore, and east of Rice and Enogai. The trail block was to prevent supply and reinforcement of Jap forces around Munda on the south shore, since Bairoko was their port of entry into New Georgia.

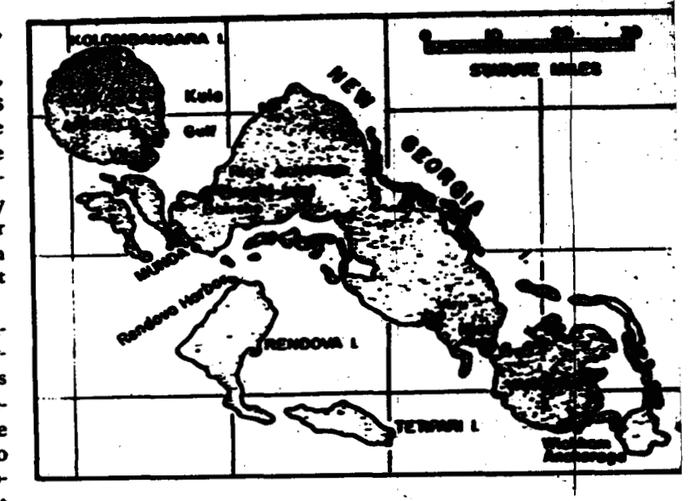
After taking Rendova, the 43d was to effect landings on New Georgia, destroy the enemy garrison, and capture the airfield. The 37th, except for units already attached to the Marines, was to be held in reserve and committed on call from Force.

In working out the reconnaissance plans it was found that there was no agency available within the division whose background and training qualified it for the particular type of jungle reconnaissance required. At that time the 43d Cavalry Reconnaissance Troop had not had the proper degree of training in jungle lore and woodcraft which is vital to the successful performance of reconnaissance missions in jungle areas.

It was decided to form eight reconnaissance patrols, each to consist of one officer, one NCO, and three men; to be carefully chosen from among the best men in the division.

The writer was made responsible for coördinating and controlling the eight reconnaissance patrols.

As D Day drew nearer, it was learned that a company of South Pacific Scouts would be attached to Force for duty on D Day plus three. The Scouts were native Fijians and Tongans commanded by New Zealand officers and NCO's. I had worked with them in the jungles of Fiji, spoke the Fijian language, and knew them to be unsurpassed as bush fighters and scouts. Having lived in the jungle for generations, their instinctive knowledge of jungle lore is far greater than the average white man can hope to attain, even with the most careful training.



The D Day plan directed that two companies of Barracudas land and secure a beachhead on Rendova Island at 0430. The Barracudas were an infantry battalion specially trained for such assignments. A combat team made up of infantry and attached artillery was to land at dawn on the Barracudas' beachhead and secure the island. The major task of the reconnaissance patrols was to begin that evening. Reinforced by two companies of infantry, they were to make the first landing on New Georgia. They were to secure a beachhead and carry out reconnaissance of trails and beach areas suitable for use by the main body.

On the morning of D Day, daylight came gradually with low, overhanging clouds and a misty rain. The tops of mountains on Rendova and neighboring islands poked their heads into gray, impenetrable fog, and ships a few hundred yards distant were only dark blobs on the water, until the muzzle-flashes of their preliminary bombardment threw them into sudden, sharp relief.

At 0630, the barges were swung over the side, and upon completion of their rendezvous circling and, on signal, headed for the beach. The men silently watched the shore line ahead. We were quickly soaked to the skin with spray and rain, but no one seemed to notice. One man nervously slipped the safety of his M1 on and off, his eyes never leaving the swiftly approaching shore. It was now 0635. No opposition was anticipated in landing because the two Barracuda companies had been put ashore as scheduled at 0430 and should have secured the beachhead.

As we drew closer inshore, we could make out the long, even rows of a cocoanut plantation with low undergrowth and bush scattered among the trees. Suddenly, the sound of firing was heard, curiously deadened by distance and water, but considering the splashes around the boats, it was obvious that we were the targets. The machine guns on the boats opened fire, hesitant at first, because of their fear that friendly troops might be

somewhere on the beach ahead. The fire from shore increased. Where were the Barracudas? We had no idea, but it was apparent that the beach was still in the hands of the enemy. Our gunfire rose to a crescendo as the gunners got on the targets and poured lead into the low bushes and treetops. By the time we disembarked, the Japs had been driven off the beach. Patrols immediately fanned out to make contact. A short distance inland, the Japs waited. After about an hour of savage fighting, enemy resistance on the beachhead ended. The mystery of the Barracudas' failure to secure it was still unexplained. They were nowhere to be seen.

I went about my task of searching Jap dead, and made an interesting discovery which was to serve me well. I had heard that the Japanese possessed a distinctive odor, but had not placed too much stock in it until now. As I examined the still-warm bodies, sometimes within a minute of the time they died, I was convinced. Whether it was their clothing, their bodies, or the blood, I do not know, but there *was* a distinct, strong odor somewhat like that of a wild deer. Afterward, under favorable conditions, I was able to smell a Jap as far away as 50 yards.

The reconnaissance men secured little rest that day, due partly to anticipation of the coming night's work and partly to Nip dive bombers, which found the beachhead and inflicted considerable damage and casualties.

About 1100, the two companies of Barracudas, disgusted and weary, put in their appearance. In the darkness, they had been landed about three miles down the coast at another beach which they had taken and secured without seeing a Jap. With daylight, they perceived the mistake and proceeded up the coast to the cocoanut plantation where they were originally scheduled to land. The reconnaissance teams were to discover how easy it was to make such an error.

As darkness fell, the 46 men prepared to embark in Higgins boats along with one company of infantry. They were to pick up the other company on the way at another island, Baralulu, where they had landed that morning. The course to New Georgia lay through Oniavisa Passage to Baralulu Island and thence through Roviana Lagoon, which was studded with many small islands and submerged coral reefs. The waters were little known and the only available chart, which had been compiled from native information, was questionable at best. Their destination, Zanana Beach, was about 10 miles from Rendova, and the last two miles were unknown.

The trip from Rendova to Oniavisa Passage was uneventful. Speed was kept down in an effort to avoid damage by the deadly rocks, but several times the men caught their breath as coral scraped along the bottom of their boat. The craft slowed to minimum speed as it approached Baralulu. There was no sign of an infantry company. Nothing could be seen except the dark, forbidding tangle of jungle as the boats grated on the coral beach. Not a man made a sound. They listened for some sound of a friendly presence, but could hear nothing. The bow-door was let down. The first men leaped out on the beach and were followed by their comrades. Without warning, a blast of gunfire came from the jungle. The machine guns mounted on the boats replied immediately and raked the bush to provide cover for the men scrambling back into the boats. The motors roared as the boats pulled back off the beach and out of range. One man was dead and several wounded.

Since a landing at this point obviously was out of the question, it was decided to try at another spot farther down the shore. During the night, repeated attempts were made to get ashore on Baralulu and find the infantry company. Each was met by enemy fire or absolute quiet. Neither the infantry nor the native guide made an appearance. An order had been published to the effect that all water movements must be made under cover of darkness, so just before dawn, the landing party had to give it up and turn back. At daybreak, they landed at Rendova and turned the dead and wounded over to an aid station.

During the day, members of reconnaissance patrols "licked their wounds," reorganized, and planned to renew the attempt to land at Zanana that night. About 1000, word was received from the infantry company at Baralulu that the Japs had been driven off the beach and landings could be made without difficulty

That night, according to plan, the reconnaissance men embarked with the infantry to which another company had been added to form a battalion. The course was set for Zanana Beach, and the flotilla shoved off with all hands in high spirits. With inadequate charts and a native guide who was as lost as anyone else, it was impossible to maintain orientation with any degree of surety. There were dozens of small islands, each having the same appearance in the darkness, and hundreds of submerged coral reefs on which the boats were constantly becoming fouled.

Once, as they proceeded cautiously through the gloom, an illuminating flare suddenly popped overhead, throwing the boats and surrounding water into a ghastly white circle of radiance. Two planes circled overhead while everyone gritted their teeth and waited for the strafing or bombs they were sure were coming. The coxswains saved the day. They stopped their boats dead still to avoid showing propeller wakes. They were successful. The light presently died out, and the sound of the planes' engines faded away.

A short time later a white coral beach became visible ahead, curving away gently to the left. Everything was eerily silent except for the easy purr of the engines as they turned the propellers just fast enough to maintain steerage-way. That beach looked familiar to me. I knew I had seen it before somewhere, either physically, or on a map or aerial photo. I knew we could not land there.

As if in sudden agreement, the coxswain gave the throttle a shove. There was something unhealthy and forbidding about that dead white beach.

Dawn was approaching, and the mission was still fruitless. The flotilla commander announced his intention of starting back to Rendova in order to arrive there by daylight. But I requested that the reconnaissance patrols be put ashore at Baralulu instead of Rendova and that two boats be left for them to attempt a landing at Zanana in daylight. By this time, I was thoroughly convinced they would never reach Zanana except in daytime, and was greatly perturbed at the thought of searching for it in the darkness and consequently delaying the entire operation.

As we landed on Baralulu, I said to the coxswain, "Do you know that white beach where you were going to put us ashore awhile ago?"

The coxswain shook his head as if he thought he knew, but was not quite certain.

"Where was it?" he asked.

"That was Munda Point we nearly landed on. We were about a mile from the air-strip, and where we were sitting on the water is squarely in front of about a hundred Jap pillboxes with everything in 'em from caliber .25 machine guns to 77mm dual-purpose guns."

It was true. Native information and aerial photos disclosed that the Nips had heavily fortified Munda Point, evidently expecting attack from straight out to sea across Munda Bar. This belt of pillboxes was the reason for attempting to land at Zanana Beach. Zanana was to the east of the left flank of the Jap's positions facing the sea.

The problem of transportation to Zanana had to be solved as the boats returned to Rendova after we disembarked.

After dawn, the reconnaissance patrols scoured Baralulu for native canoes. A thorough search of the island failed to turn up the required transportation, and spirits settled to a low ebb. It seemed a dismal prospect with no assurance of success. The men had just settled down to wait for sunset, when a familiar sound reached them —the friendly purr of Higgins boats. Poking idly along inshore were two of them, apparently undecided as to whether or not to land. A few of the men showed themselves on the beach and hailed the boats.

The coxswains of the two craft were cautious individuals. They remained offshore, circling aimlessly while they carefully scanned the men on the beach. They evidently were suspicious of a Nip trap. Deciding the figures at the water's edge were indeed friendly GI's, they lost no time in getting ashore. Questioning brought forth the information that the two boat crews were thoroughly and completely lost. They admitted that friendly faces looked mighty good to them. The boats were loaded with engineer equipment with which to blast a landing and channel at Zanana. They had been dispatched upon the supposition that Zanana had been occupied by the reconnaissance patrol. Needless to say, when they discovered that no American troops were there they were happy not to have found the place.

The appearance of the two boats was a godsend. It was transportation, but the problem of securing it for our use still remained. The two coxswains were questioned as to the possibility of using the boats to transport our party to Zanana.

It was a deal. It could not disturb anyone's plans to unload the engineer equipment, since it could not be used until a beachhead was established at Zanana. So once more the reconnaissance patrols embarked, this time, in daylight (1115). They were 46 strong in addition to the boat crews, 40 men in the reconnaissance patrols, plus four radio operators with their SCR 284, and an aid man.

During the morning, while the canoe-hunt was in progress, we talked to a native who claimed to have been at Zanana. According to him, it was unoccupied, but was visited by a Jap patrol each morning at about the same time which, from his voluble description, seemed to be 1100. That meant that there probably would be no opposition on landing. Then, too, there would be sufficient time to prepare a welcome for the visiting patrol the next day.

The boats maneuvered slowly and carefully through a myriad of tiny islands and coral reefs for nearly two hours. Finally they reached the scanty, 50-yard stretch of beach for which they had searched so diligently but fruitlessly on those two previous nights. As the two craft stood in to shore, the men scanned the shore line intently, but could see nothing but jungle. Despite this, the men were uneasy, knowing too well that an army could be concealed in that thick bush. Their apprehension was groundless. The boats drove into the beach and the bow-doors dropped. Patrols fanned out silently and swiftly to front and flanks according to plan.

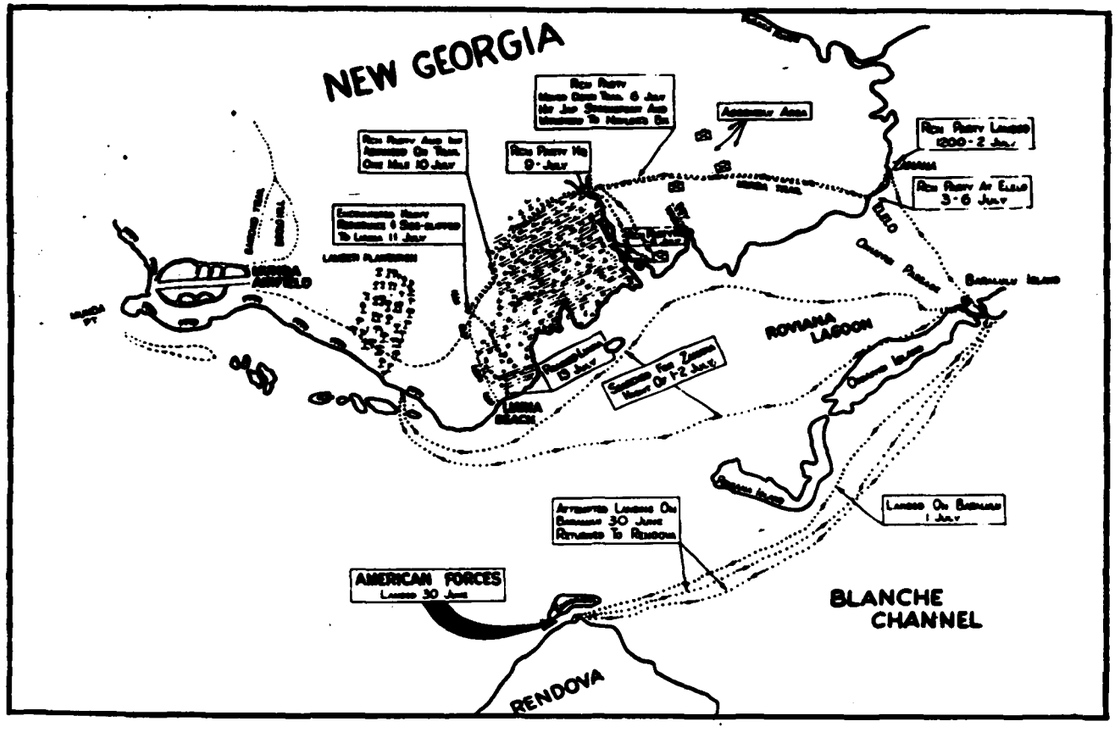
The first beachhead on the Jap stronghold of New Georgia had been established with 46 men!

The patrols, which had moved out immediately upon hitting the beach, reported the area clear of Japs within a 200-yard radius of the beachhead.

The mission was getting under way in earnest. According to the plan of action, the patrols were assigned a diversified task. Their initial job was to find landing beaches suitable for use of troops and equipment in strength. They were then to search for trails down which troops could advance toward Munda, find water sources, and seek out enemy strength, composition, and dispositions.

The first outfit to land was to move in on Zanana by battalions, and go into assembly areas off the beachhead in preparation for a push down Munda Trail to the airfield itself.

With only 50 yards of usable beach, Zanana was unsuitable for landings in force. Elelo, several hundred yards to the south, was a possible alternative, as was the mouth of the Piraka River to the north.



Since Force G-2 was extremely anxious to secure information on these landing sites, the first task was to dispatch patrols to obtain it. By native canoe, one patrol proceeded to the north along the coast to the mouth of the Piraka River, with orders to leave their canoes at that point and return to the beachhead overland. They were to search for trails, water sources, and potential assembly and dispersal areas to use in conjunction with the possible landing site at the river's mouth. Another patrol proceeded to Elelo by land with the same mission.

I was now getting anxious for the arrival of the native scouts. It was already apparent that the provisional reconnaissance patrols were handicapped by inadequate training in jungle reconnaissance. They had not acquired the knack of reading footprints and other signs, and could not possibly realize and interpret their full importance. However, it was extremely gratifying to see the enthusiasm with which they tackled their difficult job.

At 1600, the patrol from Elelo returned, with the information that there was a trail between Elelo and Munda, and that the Japs had left Elelo.

This was interesting information. The so-called Munda Trail was somewhere in the vicinity. It was known to be the main avenue of travel for the Japs along the south coast of the island. The trail discovered by the patrol at Elelo was apparently the Munda Trail, but it was different from that indicated on available maps. (Similar errors were to occur frequently.) It was necessary to maintain a constant check on maps and sketches and make the necessary corrections.

About 1700 that afternoon, the first of the infantry troops, a battalion, landed at Zanana Beach and dug in for the night. For everyone present, dusk to dawn constituted a nerve-racking, hair-raising experience. It was the battalion's first campaign and the men were green, jittery, and "trigger-happy." During that first night there was a small, intense war in progress. Our side did all the shooting. There wasn't a Jap in the vicinity. When daylight came, the men crawled from their holes, worn and haggard from a sleepless night. The score was four dead and eight wounded, all from friendly fire.

The first item in our business of the day which had to receive attention was the Jap patrol which was in the habit of visiting Zanana daily. We decided to turn the Jap's punctuality to advantage, and a patrol was sent down the trail as a reception committee. The patrol later reported that the Japs appeared on the trail at exactly the expected moment. They were strolling casually through the bush as if it were main street in Tokyo. Their carelessness was fatal. The patrol removed all papers from the bodies for translation by the G-2's language section.

In the meantime, the men not actually on patrol

moved to Elelo, leaving guides to inform returning patrols as to the new base of operations. We had been at Elelo only a short time when the patrol which had gone to the Piraka River the previous afternoon reported in with valuable information. The Piraka seemed to open another avenue into the planned infantry assembly area.

Although information of the coast between the Piraka River and Elelo was now fairly complete, knowledge of trails in the interior and of enemy disposition and movement was scanty. The next move was to correct this deficiency. Reconnaissance teams were sent out with an over-all mission of covering the entire area between Elelo and Munda airfield. One patrol was sent directly to the airfield to secure all possible information of routes leading thereto, and of enemy strength, composition, and disposition on Munda Point. Another patrol started for Bairoko Trail, the supply trail leading from Mundo to Bairoko Harbor on the north side of the island. Their mission was to watch the trail and tabulate all movement to or from Munda. In that manner, a running account could be maintained as to what was added to or subtracted from the garrison there. Patrols also were assigned to terrain reconnaissance. Objective: trails toward Munda over which friendly infantry could advance; second mission, finding water sources. Water supply of troops was a constant problem and information of all sources was vital.

Finally an advance patrol of the South Pacific Scouts arrived and the task of reconnaissance could be performed with ease compared with the heartbreaking effort it required of the relatively untrained patrols.

The terrain reconnaissance was bearing fruit. Knowledge of the interior trails was constantly augmented by patrol reports. Frequent messages were sent to Force G-2 to enable him to make accurate changes on maps and sketches which often were in error.

The little force at Elelo was increased by the capture of their first prisoner of war, a gunner in an airplane which crashed in the water offshore. He obligingly swam to the beach where the men waited to receive him. The PW spoke a little English and, when convinced that no one had immediate intentions of killing him, interpreted the dog tags picked up in the vicinity the previous afternoon. His interpretation later was found to be accurate.

There was no PW enclosure available, and no means of evacuating the prisoner. He spent the night beside a New Zealand Sergeant, and made no effort to escape, apparently deciding that if any worrying was to be done, the Americans could do it. He went to sleep, and much to the disgust of the New Zealander, did not make a move which could possibly be interpreted as being lethal.

On July 5, the remainder of the Scouts came in, and plans were made to relieve the American patrols and return them to their original units. They had done their job well against severe handicaps, and had secured and passed on to Force a very considerable amount of information concerning trails, beaches, water sources, and terrain. It was anticipated that they would continue to perform patrol missions.

By this time, additional infantry units had landed, and were moving into their assembly areas preparatory to driving down the trail to Munda. One battalion had moved south toward the Barike River, and was in bivouac there. Another battalion was still at Zanana.

The next day the Scouts moved to the Munda Trail and prepared to reconnoiter it toward the airfield. It was to be the axis of advance for the infantry.

Landings up the coast from Munda undoubtedly had surprised the Japs. They recovered quickly, however, and were moving their forces to the north and northeast to meet the threat to their flank and rear. The Scouts found definite evidence of this as they moved down the trail toward Munda. Near the junction of the trail and the Barike River, the Japs opened up on us from a ridge with machine guns and rifles and pinned us down. Here I received my second wound of the campaign, a caliber .25 machine-gun bullet through the leg.

The enemy as usual was cleverly dug in and concealed, but the Scouts succeeded in nosing out a series of newly constructed emplacements and pillboxes. A message was immediately sent back to the infantry, and a company was sent up to knock out the strong point.

We had intended to sideslip to the south of the strong point and discover what lay to its flanks and rear. Jap patrols, however, were exceedingly active and numerous. With dusk approaching, it seemed unwise to attempt to pierce the screen before nightfall. Not wishing to spend the night ducking enemy patrols, the Scouts withdrew to the south and east along the Barike, made contact with a battalion in position to the north of the river with its left flank at the river's mouth, and spent the night in the comparative safety of the battalion perimeter.

Next morning, the Scouts moved up the river about a quarter mile to establish a base of operations. Supplies were running low. The wounded had to be evacuated by canoe down the river to the beach at Zanana from which they could be taken out by Higgins boat.

Through the media of patrol reports, a definite picture of enemy operations was beginning to form. The strong point on the Barike and the numerous enemy patrols constituted a screening force to delay the infantry's advance, while a MLR was being organized. Penetrating the screen, the Scouts located and reconnoitered the Nip's main positions one by one. Detailed information was promptly transmitted to Force.

Patrolling was becoming more difficult and dangerous each day. The enemy was thoroughly awakened to the situation, and it was almost impossible to move in the jungle without encountering Japs. All too frequently, patrols returned with a member missing and one or two wounded. They were proving their mettle

in short, vicious skirmishes which characterize aggressive patrol action.

It finally required an entire infantry battalion two days of hard fighting to knock out the strong point which the Scouts had discovered the first day on the Trail. We moved back to the junction of the trail and the Barike and set up a base of operations.

The atmosphere was bristling. The jungle was a hornet's nest of Japs, moving day and night. Patrols watched and reported.

One patrol returned with information of Bairoko Trail. This byway had been the Scouts' bugaboo. It was known that a trail existed between Munda Airfield and Bairoko Harbor to the north. Patrols had repeatedly gone out to find it and report what traffic it carried, but without success. Persistence finally won out, the elusive trail was located and the usual corrections made on all maps. Indications were clear that the Japs were moving out of Munda to north and northeast.

The situation was ripe for a fight. An infantry regiment was in its assembly area, with one battalion on the left, another astride the Munda Trail, and a third in reserve.

Another battalion of infantry was assembled to the north of the trail. Since the action seemed destined to center on the Munda Trail, it was made the axis of patrol activity.

As the situation developed, a change was made in the administration of reconnaissance missions. The writer was relieved from direct command of the Scouts, and was attached as special staff officer to Hq of an Infantry regiment. The Scouts operated under a New Zealand officer, but as liaison officer for Force and Regimental Headquarters I still assigned their missions.

As contact became imminent, the regimental CO became increasingly apprehensive of his flanks and rear, especially the north flank. The south (left) flank, was anchored on a swamp which, at some points, extended slightly north of the trail itself. Any large movement through the bog was improbable as long as the north (right) flank offered comparatively favorable terrain.

On July 9, the Scouts' patrols were providing security for flanks and rear as well as probing at the airfield and the enemy flanks and rear. They also were kept busy orienting the various units as to their relative positions. With visibility often limited to a very few feet by the dense jungle, even a squad leader could only guess where the rear of his squad column or a flank of his skirmish line might be.

On the morning of July 10, the advance down Munda Trail began against light opposition. On the 11th, however, as the infantry approached the junction of the Munda Trail and a trail from Liaina Beach to the south, they encountered heavy resistance. The Japs were well dug in, and defending their positions with grim tenacity. It was immediately apparent that the infantry had hit a stone wall which it didn't possess the strength to breach. The Scouts brought in disturbing reports of the Japanese strength. Commanders had come to place implicit faith in those reports. Reinforcements were an absolute necessity, but getting them was quite another thing.

An Infantry regiment, less one battalion already committed, were coming in through the beaches at Zanana and Elelo. Those unsatisfactory landing sites could not handle more troops. Liaina Beach offered the best landing, but it was the right flank of the strong Jap positions which the doughboys were now battering. If that enemy anchor on the beach could be knocked out, it would mean that reinforcements would have an opportunity to land and strike on the enemy flank. It seemed worth the attempt.

It was decided that the infantry would sideslip to the left and move laterally along the face of the Jap line of resistance to Liaina and secure the beachhead.

The Scouts, doing magnificent work, often pointed out Jap guns and fields of fire into which the doughboys otherwise would have stumbled blindly. They simply could not see through the jungle foliage, and even after an enemy gun had exacted its toll, it was extremely difficult to locate and silence.

The gruelling pace was beginning to tell on the Scouts. Casualties were high and the natives were saddened by the accidental death of one of their officers, a favorite among them. He was killed while directing an artillery concentration on an enemy installation. To compensate for poor visibility, he deliberately crawled to within 30 yards of the target. He brought the fire too close. Despite lack of rest and adequate rations, the Scouts continued to outpatrol the Japs night and day. Nor did their own losses stop them. They were frequently inside Japanese bivouacs. One New Zealander himself spent one night in a foxhole with a Jap soldier. Both were seeking refuge from American artillery fire. The Jap, apparently mistaking the captain for one of his countrymen, grunted a greeting and moved over.

The Japs made their customary attempts at trickery and deception. One time I received a message from Force asking for additional data in support of my urgent request for artillery fire on a certain area. The request, radioed to Force, had been signed with my name, but had not originated with me.

Immediately I was able to advise Force of this attempt at deception by the Japs.

The Japs had requested fire on an American bivouac area.

On the morning of the 12th, I was with the leading battalion in the lateral movement to Liaina. The most direct route to the beach lay through the swamp; therefore, believing there would be little opposition in the swamp itself if they could reach it without interception, I recommended that they follow a compass course directly across it. The battalion was now west of the bulge in the swamp which projected to the north across the trail. Fear that the Japs might react quickly enough to hit the lateral movement on the flank was well founded.

That afternoon, shortly before the leading battalion reached the swamp's edge, the Japs struck immediately to the rear with a reinforced battalion and succeeded in cutting the American column in two. One battalion, the New Englanders (White Mountain Boys) apparently the Jap's focal point, was receiving intense machine-gun and mortar fire. The two rear battalions were relatively untouched.

Once again, patrol information provided the basis for a change of plan. The Scouts had determined that there was no other large enemy force in the area except the one pouring it on the New Englanders. If this battalion, almost on the edge of the swamp, could keep the Japs engaged, the other two battalions could by-pass to the east and proceed unimpeded across the marsh to the beach.

A message was sent to the other two battalions recommending this course of action, and Scouts to guide them through the swamp were arranged for. The recommendation was accepted. The White Mountain Boys settle down to fighting off the Nips who were inflicting casualties, but not making appreciable headway.

The scheme worked. The other two battalions moved through the swamp and tore the Jap flank off Liaina Beach, thus opening the way for further landings.

In the meantime, the White Mountain Boys dug in preparatory to spending the night of the 12th on the edge of the swamp. The following morning, they pushed into the swamp itself in an effort to disengage. That evening the battalion entered the regimental perimeter on Liaina Beach.

The following morning infantry arrived on the new beachhead. The initial phase of the New Georgia campaign was completed.

Lessons Learned

1. For jungle operations, reconnaissance personnel must have specialized training. It takes more than guts and enthusiasm for a man to hold up his end on a jungle patrol. He is not worth much without a solid backlog of jungle know-how. If a scout cannot "read sign," he cannot get his job done.

2. Current doctrine pertaining to scouting and patrolling is adequate and sound. It provides an excellent basis for further specialized training. As soon as sufficient information is available, commanders must not fail to conduct training particularized to the areas in which their units are likely to be employed. Training for jungle reconnaissance imposes stern responsibilities on a unit.

3. Since most jungle patrol engagements are meeting engagements, each patrol should be equipped with two or three automatic weapons of the submachine-gun type to deliver a high volume of fire in critical moments. Arming of the patrols on New Georgia presented no particular problem, since each man generally acquired from the wounded or dead that weapon for which he had a preference, or one with which he felt himself especially proficient. Reconnaissance patrols of the 43d Division were armed with M1 rifles and Thompson submachine guns, while the South Pacific Scouts had the caliber .38 Australian Owens gun, the equivalent of our tommy gun, plus an assortment of rifles including M1903, M1917, the M1, and the British .303 rifle.

4. Knives are indispensable. A satisfactory knife may be improvised from salvage metal such as an old vehicle spring, or a discarded file. It should be designed to open up Japs and jungle trails with equal facility.

5. Grenades are first-rate jungle patrol weapons. Scouts in New Georgia often used them to delay pursuit when surprised or ambushed. Scattering like a flushed covey of quail, members of the patrol fired their weapons and dropped grenades as they ran. They would reassemble at a previously designated rendezvous.

6. Patrol formations must be kept flexible because of the restrictions imposed by terrain and visibility. When it was practicable for the flankers to move off the axis of advance, the patrol generally would take up a loose diamond formation with the patrol leader initially in the center. More frequently, however, the patrol moved in a column with sectors of responsibility assigned to each man in order to attain a measure of all-around protection.

7. Patrol leaders have a hard row to hoe in maintaining control of their men. Often, a man cannot be seen standing three feet away. One man cannot control more than four others in heavy jungle without sacrificing speed and flexibility of movement. The use of small patrols helps solve the patrol leader's problem in this respect.

8. Generally speaking, the Jap is a lousy marksman, particularly on moving targets. Move fast and keep moving when fired upon. Fire may be received at such close ranges the opposition's strength may be ascertained by noting the sound of rifle bolts being opened and closed. Even at short range, few Jap riflemen or machine gunners can hit a man who does not give the grass a chance to grow under his feet.

9. The Jap stinks. Like a poisonous gas, he has a distinctive odor. Detection and recognition of it by a patrol member many times will prevent ambush.

10. Knowledge of the natives is essential to proper evaluation of information from native sources. My understanding of the people and the ability to speak the language enabled me to gain much information which otherwise would have been lost.

11. Too much cannot be said in favor of the natives who constitute the rank and file of the South Pacific Scouts. Simple and childlike, they nevertheless possess real courage and determination. In the execution of their tasks, they saved the lives of many American soldiers.

A CAVALRY MECHANIZED SQUADRON IN DEFENSE

*by Lieutenant Colonel Paul L. Burke**

". . . The scattered cavalry outposts allowed the enemy to approach through these canalized routes until he was on their outer wire defenses. Then, at a given signal, all weapons opened up at point-blank range. In the light of 66mm mortar illuminating shells, the Germans were seen to be in headlong retreat back along the Rohren and Hammer roads."

PRIOR to and during the period of the "Belgian Bulge," the 102d Cavalry Group held dismounted defensive positions on the northern shoulder of the break-through area. At the beginning of the German offensive the 38th Squadron was subjected to, and successfully withstood, repeated attacks. The squadron eventually received a Presidential Citation for outstanding, courageous execution of its mission—"to hold its ground."

The successful action of the squadron had been credited to farsighted and complete "organization of the ground for defense," as well as to the individual and collective heroism of its members.

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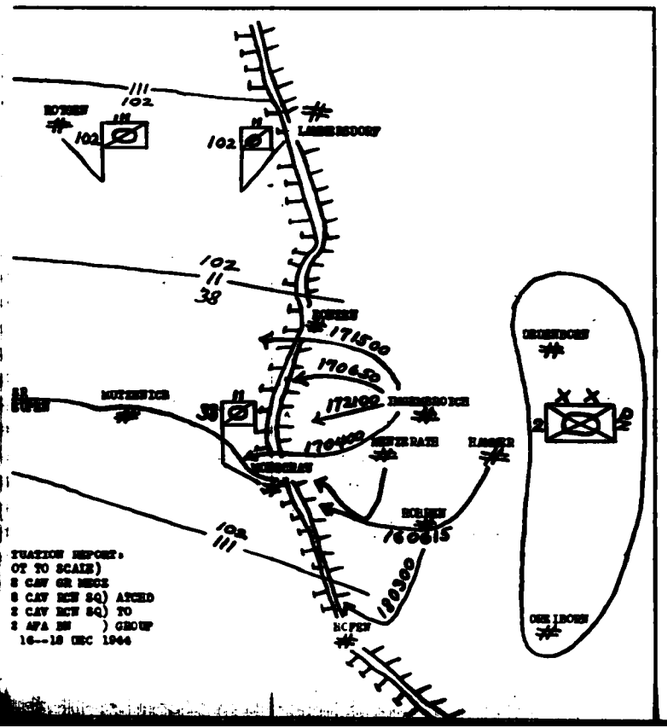


For five weeks preceding the German attack the squadron, under Group supervision, worked tirelessly and ceaselessly to prepare its sector for defense. Fields of fire were cleared. Machine-gun positions were prepared and occupied. Mortars, organic assault guns, and the guns of attached self-propelled artillery battalions were registered in accordance with detailed defensive fire plans. Great quantities of antitank and antipersonnel mines were laid. Defensive concertina wire, well booby-trapped, was emplaced. An endless number of trip wires attached to flares and explosive charges were strung out. Listening and observation posts were established and maintained; and dismounted patrolling, both day and night, was continuous. How well these efforts were rewarded is indicated in the following paragraphs.

DEFENSE OF MONSCHAU SECTOR BY 38TH CAV RCN SQ

SPECIFIC DATA*: During December 16, 17 and 18, 1944, the Germans launched a full scale offensive in the Monschau sector in an effort to secure the Monschau-Eupen highway for future mechanized operations of the 2d Panzer Division, then assembled in the Dedenborn-Dreiborn area. The 38th Cavalry Reconnaissance Squadron (Mechanized), defending this sector with a strength of about 700 men and officers (less attachments), occupied a line on a front of over 9000 yards, from the town of Monschau (inclusive) to Lammersdorf (exclusive). All elements of the squadron, then on its 107th consecutive day of enemy contact, were employed facing the fortified positions of the Siegfried Line less than 1000 yards away. The 3d Platoon, Company "A," 112th Engineer (C) Battalion was attached to the squadron as well as liaison and forward observer parties from the 62d Field Artillery Battalion, then attached to the 102d Cavalry Group.

On December 13, 1944, the 2d Battalion, 16th Infantry Regiment, was withdrawn from supporting positions astride the Monschau-Eupen road and the squadron became the only unit in this sector between the German lines and V Corps Headquarters located in Eupen. During the period December 13-14-15, 1944, there was a marked increase in enemy activity. The attached engineer platoon was employed constantly, day and night, strengthening the squadron's defensive wire, mine and flare fields. The fire missions of Troop "E" (Assault Gun Troop) and of the 62d Armored Field Artillery Battalion increased about 30%. Additional listening posts were established well in front of the squadron line.

*Extract from an informal historical report.

On the night of December 15-16, 1944, much enemy air activity was noted over the squadron area, accompanied by an unusual use of pyrotechnics. Reports of German paratroop landings began to filter down from higher headquarters, and all personnel waited the coming of daylight, on December 16, 1944, in a state of tense and alert expectancy.

December 16

On December 16, 1944, the enemy struck. During the three-day period which followed, the Germans made five desperate attempts to penetrate the squadron lines and secure the Monschau-Eupen highway. These attacks ranged from a frontal assault, in battalion strength, to combined frontal and enveloping attacks employing elements of two regiments (751st and 752d Regiment, 326th Volks Grenadier Division).

Early on the morning of December 16, 1944, the enemy preceded his attack by a 35-minute artillery, mortar and rocket barrage of unprecedented severity. It was an obvious and effective attempt to isolate the Monschau sector by fire; all telephone communications were destroyed and the main supply route denied by a series of time-on target concentrations, which were followed throughout the day by severe interdictory and harassing fires.

At 0615A the enemy attacked Monschau from the east in battalion strength, employing both battalion and regimental support weapons. The thinly spread tank and reconnaissance platoons met and repulsed this numerically superior force in complete darkness. On the southeast of the town, noncommissioned officers, of necessity commanding the defenses of these strategic approaches, displayed outstanding combat proficiency. The approach of a company of enemy infantry from Menzerath, Hammer and Rohren was detected only a few minutes before contact was established. Coolly, and with grim determination, the scattered cavalry outposts allowed the enemy to approach through these canalized routes until he was on their outer wire defenses. Then, at a given signal, all weapons opened up at point-blank range. In the light of 60mm mortar illuminating shells, the Germans were seen to be in headlong retreat back along the Rohren and Hammer roads.

Simultaneously with the above attack, a larger enemy force concentrated on the high ground east and northeast of Monschau, and deployed to attack from the dragon's teeth and the "snake road" leading from Imgenbroich. Here the enemy assaulting infantry was pinned down by machine-gun fire from squadron trench positions in this area until forward observers from the squadron assault-gun troop and the 62d Armored Field Artillery could adjust on the target. In this manner the German attack was broken up at ranges of from 200 to 600 yards. The enemy was unable to close with the lightly held line and the attack was repulsed. At 0745A, coming from the Monumenth Hill in stronger force, the enemy partially succeeded in driving a wedge up the bed of the Roer River and within the cavalry outpost. The force of this attack was broken largely by the fire of a machine gun dismounted from one of the tanks defending the draw, reinforced by tank fire.

For the balance of the day the Germans kept up strong patrolling and sniper action. The squadron employed artillery fire and aggressive patrol action to prevent and break up the assembly of enemy troops on the squadron front. Observation posts and outposts reported the filling of pillboxes by the Germans and all intelligence pointed toward another attack to come. Every effort was made to bolster the squadron's thinly spread defense and immediate reinforcement was requested from the 102d Cavalry Group. Company A, 146th Engineer (C) Battalion was attached and reported to the squadron commander at about 1700A December 16. Two engineer platoons were attached to troops in the line and a third dug in supporting positions on the high ground west of Monschau, in Squadron reserve.

Again, the night of December 16-17 was marked by unusual enemy air activity and the use of many varied types of pyrotechnics. Large, low flying enemy airplanes passed over all troops; flying from east to west and returning, some dropped flares and others carried wing lights. Patrols and listening posts were put out in greater numbers, and indications of enemy troop movement were reported during the night.

December 17

At 0400A, on December 17, a listening post just west of Menzerath detected a large body of enemy approaching from that town. In the darkness, the listening post was very nearly overrun and the personnel were forced to engage in a fire fight for their own self protection. Although faced with tremendous odds, they maintained their vantage point and by radio adjusted artillery fire which inflicted severe casualties, and forced the enemy to withdraw.

Two and one-half hours later the enemy again attacked, accompanied by a repetition of the previous day's preparation barrage. Initially, three battalions attacked on all troop fronts from Monschau to Konzen

and, simultaneously, enemy paratroopers of Colonel Von der Heydte's German paratroop regiment became active in rear of the squadron lines. The main attack developed, in regimental strength, to the north of Monschau in an effort to gain the dominating Mutzenich Hill and sever the Monschau-Eupen highway. Other points on the squadron front were subjected to strong and well-organized assaults by forces ranging from company to battalion strength. Enemy small-arms fire became severe and all advances by the Germans were supported by direct as well as indirect artillery fires.

In successive waves, the numerically superior enemy drove against, among, and through the beleaguered cavalry positions.

The squadron's light tanks defending the northern approaches to Monschau met the first thrust of the German attack just before dawn. Gaining the element of surprise by virtue of their well-camouflaged positions, the tankers skilfully employed every available weapon and effectively turned back over a company of the enemy. Heavy casualties were inflicted and an early attempt to sever the corps MSR at this point was denied.

As the attacking German infantry pressed north of Mutzenich, they commenced to infiltrate among the small farms on the outskirts of the town. Outposts were partially cut off and subjected to flanking fire. Fighting in small groups, these men refused to give ground which would have further exposed their comrades. Strong points were established by as few as four men and tenaciously held out while one hard-pressed platoon, which had had its line penetrated, counterattacked to restore its positions. Armored cars were employed to attack the advancing enemy and the German wedges were effectively driven out.

At one point the Germans succeeded in crossing the main supply route, at the northern edge of Monschau, under heavy supporting fire and established a machine-gun position within the squadron defensive positions. As in the several other instances of this nature, the cavalrymen held their ground, and the enemy position was eliminated by four tank crewmen who flanked and charged the German machine gun with small arms and hand grenades.

Forward observers, both from the Squadron Assault Gun Troop and from supporting artillery units, were mainly instrumental in breaking up the formation of enemy support and reserve troops which followed the main effort of the attack. All of these forward observation parties were forced to engage in fire fights at one time or another, in order to maintain their positions and protect themselves and their equipment.

North of Mutzenich, where five reconnaissance platoons defended a front of 6000 yards, the Germans achieved a penetration in force. More than 65 of the attacking infantry gained the dense forest behind the cavalry positions, and elements of the German paratroops dropped the preceding night also engaged the desperately fighting platoons from the rear. Observation posts of the 62d Armored Field Artillery, 186th Field Artillery and the 955th Field Artillery Battalion were overrun by the advancing Germans. Despite these numerous and formidable enemy threats, all lines and positions were maintained with grim determination and existing gaps sealed by employment of the attached engineers. Later in the day, added reinforcements in the form of Company A, 47th Armored Infantry arrived and deployed in the heavily wooded area of the break-through to clean up all enemy resistance in this sector. These reinforcements later joined forces with the cavalry and assisted in strengthening their lines.

At the height of the enemy's main effort, and as German support battalions commenced to move up in the area north of Mutzenich and Monschau, all available personnel were turned out to provide last-ditch security. Rear echelon maintenance and supply sections were employed as command post security and prisoner of war guards. Soldiers being treated at the squadron aid station, adjacent to the command post, were directed to rejoin their units. All prisoner of war statements indicated that an armored attack by the 2d SS Panzer Division was to follow the infantry assault that same day and the squadron prepared to hold at all cost.

From 0650A to 1500A the fighting continued with tremendous odds being thrown against the cavalry front. Gradually the platoons gained local control and artillery observers were enabled to place accurate fire on German troop concentrations as well as on routes of approach and supply.

At 1500A the beaten enemy commenced to withdraw under the constant pressure of artillery, mortar, tank and machine-gun fire. Two hours later the reinforcing infantry troops (Company A, 47th Armored Infantry) who had been cleaning up in the woods west of the squadron, came through and were integrated among the platoons for the night. Ten medium tanks were also placed in support of the line. The squadron, still in its original positions, consolidated for the expected armored threat.

As darkness fell, listening posts were put out, and patrols sent into enemy territory. At 2100A the Germans struck again. A large enemy force was detected approaching Monschau from the vicinity of Imgenbroich and was immediately illuminated by flares and 60mm mortar illuminating shells. In the resulting light approximately 200 Germans were taken under fire by the squadron's forward observers, and by tanks and machine guns. The engagement lasted for approximately 45 minutes, after which the enemy withdrew again with severe losses. At 2230A listening posts reported the approach of large numbers of troops from the direction of Imgenbroich, and again heavy fire was placed on an estimated 100 of the enemy, under the light of the 60mm mortar illuminating shells. Many casualties were observed and the German attackers dispersed.

December 18

At 0300A, December 18, an intense enemy artillery and rocket barrage fell on the Monschau and Hofen areas, which preceded an attack on the 395th Infantry defending Hofen Hill just south of Monschau. An estimated reinforced German battalion, followed by tanks, attempted to envelop the Monschau area from the south in a third desperate maneuver to seize the Monschau-Eupen road. Right flank elements of the squadron south of Monschau and on the Hofen Hill were engaged by enemy direct artillery fire and infantry action. At 1000A, the Germans had achieved a penetration among the infantry's positions, and units adjacent to the cavalrymen were withdrawn to be used elsewhere in a counterattacking rôle. Simultaneously, the weakened left flank of the infantry was subjected to a frontal attack. Marshalling their scant forces, the cavalrymen filled the gap and assisted in repelling this attack by the coördination of all available weapons including artillery.

Despite the terrific pressure under which the squadron fought against a numerically superior enemy, all elements maintained complete control and communications throughout the three days operations. This communication involved the maintenance of over 50 miles of telephone wire, 65 telephones and six switchboards, for which no personnel are assigned or trained within a cavalry squadron. In addition there were 16 active radio nets, incorporating approximately 63 radio sets. As a result the squadron commander was enabled, at all times, to present a clear and comprehensive picture of the situation to the cavalry group commander, and to conduct a coördinated defense.

The successful defense of the wide sector entrusted to the 38th Cavalry Reconnaissance Squadron (Mechanized) was due to the spontaneous, intelligent and combat wise performance of a great number of small groups of men. With every platoon committed, without supports, and with only an engineer platoon in reserve, it was the heavy sense of responsibility and the combat skill of each man on the line which maintained the integrity of the position. In the performance of its mission over the period of December 16-18 the 38th Cavalry Squadron (Mechanized) displayed outstanding performance of duty in action against the enemy and achieved a brilliant success in stopping the full scale German offensive in the Monschau sector. The significance of this is best brought out by the statement of Major August Braunwarth, commanding the German 54th Werfer Regiment, who was captured on January 13, 1945, at Mont le Ban, to the effect that: "We failed because our right flank near Monschau ran its head against a wall" (First U. S. Army PWI Reports January 15, 1945).

Ammunition Used in Europe*

The machine gun, cal. .30, threw more lead in Europe from D-Day to VE-Day than any of the other small arms used by the Ground Forces—392,088,000 rounds, according to Ordnance Department figures. Next was the M-1 rifle with 241,885,000 rounds. Surprisingly, the .45-cal. automatic pistol accounted for 97,369,000 rounds as against 11,310,000 fired by the BAR.

The Ordnance Department listed the ammunition expenditure as follows:

Carbine, Cal. .30	130,022,000
Rifle, U. S Cal. .30 M1903	56,164,000
Rifle, BAR Cal. .30 M1918A2	11,310,000
Rifle, U. S. Cal. .30 M1	241,885,000
Gun, Machine Cal. .30 Ground	392,088,000
Pistol, Auto. Cal. .45, M1911A1	97,369,000
Gun, Machine Cal. .50 BB Blex CB	105,619,000
Mortar 60mm M2 W/mount	4,881,196
Mortar 81mm M1 W/mount	6,324,249
Gun 37mm AA (Carr Mtr Mult Gun M 15A1	467,814
Gun, 37mm AT Wheeled	1,170,081
Gun, Auto. 40mm AA	1,153,156
Gun, 57mm M1 Wheeled	631,080
Gun, 75mm Tank	2,003,952
Carriage Motor 75mm Howitzer M8	1,604,617
Carriage Motor 76mm Gun AT M18	972,650
Carriage Motor 3-in. Gun M10	1,639,780
Gun, 90mm AA Mobile	1,022,141
Carriage, Motor 90mm Gun, M36	424,741
Howitzer, 105mm Field M2A1	16,808,080
Howitzer, 105mm M3 (Short Barrel)	1,972,349
Howitzer, 155mm M1 M1918	4,548,526
Gun, 155mm Field M1A1	1,395,224
Gun, 4.5-in. M1	694,234
Howitzer, 8-in. M1	484,523
Gun, 8-in. Field	41,652
Howitzer, 240mm M1	82,494
Fuses for separate Loading Ammunition	8,830,681
Launcher, Rocket AT 2.36-inch (Bazooka)	1,310,823
Rifle-Grenade, Total	1,817,757
Mines	1,856,234
Torpedo Bangalore	73,734
Hand Grenades, Total	4,853,888

*Army and Navy Register.

HARASSING

by Major Thomas J. Brett*

DURING the period of December 1, 1944, to March 31, 1945, many cavalry units were placed in static situations, relieving infantry divisions on the Roer, and later on the Rhine. Infantry missions gave the cavalry an opportunity to demonstrate its flexibility in assuming and efficiently completing another type of difficult mission. One of the outstanding features of the new assignment was its initiation of a harassing program on both the Roer and the Rhine.

The 36th Cavalry Reconnaissance Squadron had three German 75mm towed guns and one U. S. Sherman tank that, although disabled, could be pulled into position. This made 4 guns available. They were placed in position during the night and, with ammunition which had been gathered from various sources, began shelling the small enemy held towns across the river. Cavalrymen without artillery experience operated the guns with the simplest type of fire control. Their fire nevertheless greatly harassed the garrisons, CPs, and installations in the small towns, and at no time was German counterbattery fire received.

Tanks

During this stage of operations the Germans were very wary lest a tank attack be launched from the American sector. It took only the noise of tanks running down the road near the front to set the German artillery and entire defense into high activity. Before harassment runs were made by tanks it was necessary that careful coördination be made with all adjacent units and artillery; every man of our own troops had to be notified of the time that the tanks would move, and the exact route to be taken. A careful reconnaissance of the route also was made by the tank commander to spot shell holes, piles of debris, and to brief road blocks. The first and second run of the tanks was made buttoned up as the enemy was expected to heavily shell the critical road junctions at which he would be able to hear the tanks passing. The third run was made with the turrets open, because it was discovered that the enemy was always three to 10 minutes late in placing his artillery to intercept the tanks. These runs were always made at night to restrict enemy observation, and they were very effective as the enemy remained stirred up for hours after them and expended hundreds of rounds of ammunition.

Four .50 caliber machine guns or 4 water-cooled .30 caliber machine guns in battery were used in indirect fire against known enemy towns and installations to disrupt the routine of everyday procedure. This made the enemy miserable while resting, messing, and travelling to and from installations.

We learned of the exact locations of the enemy CPs, messes, stables for cart horses, motor pools, routes of relief, routes used by carts bringing up hot meals, and artillery positions. Through indirect fire method and observation of strike these known locations were continually harassed by three to 4 batteries of machine guns. Alternate and supplementary positions with adjoining trenches were essential. Ten men were used in each battery, two men per gun, an officer or NCO in charge, and an OP. All work on installation was done at night, but actual firing took place in the daylight, as it was learned that the enemy was very alert during hours of darkness but used the daytime to rest and mess. The results of this type of firing were verified when captured POWs related a story of a continual hail of bullets around the towns and routes that they were forced to use. Many German soldiers even went without their meals for 24 to 48 hours.

Silence

Another method of harassment was used by the entire XIII Corps during January, 1945, on the Roer. At certain times all guns of the corps and its supporting troops ceased firing for 31 hours with the exception of shots fired at infiltrating Germans or by Jerry himself. One can imagine the thoughts of the enemy during this silence, especially since he was expecting two or three rounds of artillery on his position for every round that he fired into the American sector.

At 0700, after 31 hours of silence, all guns including artillery, machine guns, mortars, and rifles, opened up on every known enemy position. A heavy smoke screen was placed on their OPs and for 20 minutes this mighty bombardment continued.

At 0720 all guns ceased firing and for us the show was over; but the enemy remained energetic through the rest of the day, firing salvo after salvo at non-remunerative targets. It was later learned that every individual Jerry was on the alert in a defensive position throughout the remainder of the day.

Combat patrols of from 4 to 40 men were organized. Each patrol was carefully planned and S-2s of the group and squadron supplied all available information. Members of the patrol were excused from any other duty to prepare and plan for their one mission. The subject of combat patrols has been well covered in previous articles, therefore the writer will not go into the details of their planning. A number of these combat patrols, which infiltrated through enemy lines, and harassed the enemy over a 10-day period kept the enemy front line troops critically "on edge" at all times.

Loud Speakers

The use of loud speakers for propaganda and harassing of the enemy should be carefully planned. Although the following plan was not used by the cavalry it was used by other units and should be included here. Before the actual use of the loud speaker the following information about the enemy must be obtained: pinpoint positions of enemy troops in line, and of each enemy emplacement; and the names of individuals manning those positions. In many cases this is possible by POW interrogation. Preferably a pillbox or well fortified position should be selected for the loud speaker. The broadcaster should say something like this (with embellishments, of course, in German): "We are giving you the opportunity to surrender. If you do not we are going to destroy you. We know your exact position and we know every man in that position. For instance: Corporal Willie, we know that you are in a pillbox, in a grove of trees near the big bend in the river. To prove it we are going to destroy you and your pillbox." All artillery in the sector will have been previously coördinated to fire on that one pinpointed target and will proceed to destroy the position and annihilate the enemy. On cessation of fire the propaganda should immediately continue: "Sergeant Hans, you are next. We are giving you 10 minutes to surrender. If you do not surrender by that time we will destroy your position and all of your men as we have just destroyed Corporal Willie's position." The announcer should then go ahead and warn other positions of their destruction if they refuse to surrender. The writer knows of the very effective use of this system in the Brittany campaign by the 66th Infantry Division. The use of loud speakers, however, to emphasize our power and numbers without such prior planning as described above, should be discouraged.

Artillery

In the harassing program, artillery was used at intervals throughout the day and night on critical road junctions, towns, routes of communication, and known OPs. Detailed schedules of fire for each gun and each target were initiated by the corps artillery and proved very effective. The use of artillery to lay a smoke screen just in front of the enemy lines at odd times not only aided in the harassment of the enemy but provided concealment for American forces when they crossed the river to attack.

Pyrotechnics

Pyrotechnics were never used to full advantage by the cavalry in its sector. They can be used effectively; but again, as in any other program, must be carefully coördinated and planned.

White phosphorus flares were used extensively by units in the entire front line sector at all times during the hours of darkness to deny the enemy free movement in his own sector.

High Velocity Weapons

When it was known that the enemy had a strongpoint in a pillbox or in a large, thick-walled building that could not be destroyed by normal artillery fire, towed tanks were brought up during the night to a prearranged and prepared position. At first light the weapon was boresighted on the enemy strongpoint and the crew fired the high velocity gun "rapid fire" for 5 to 10 minutes. The crew then scrambled to a prearranged basement or shelter, leaving the gun in its position, as the German artillery, both high explosive and time fire, soon begin arriving in quantity on the spot.

The result of this type of harassment is doubtful, although it caused consternation among the enemy who were sleeping or on duty in the strongpoint. It boosted the morale of the men in our own sector, who generally had a "hate" for any German strongpoint. The crews of the tank destroyers came away after having had the "time of their lives," and enjoyed the entire mission.

The same procedure was used across the Rhine during the hours of darkness, but in this instance we exploited the quadruple .50 caliber guns of the AAA. The enemy at the time was very alert to the landing of our patrols on their side of the Rhine, and when the patrols landed the entire enemy defensive sector would fire and expose their positions. At this time the quadruple .50's of the SP AAA, which had been driven up behind the dike during the early hours of darkness, were moved up to the edge of the dike. They opened up and grazed the opposite side of the river dike and road with concentrated bands of fire. Again it is not known whether this procedure materially aided the harassing program, but the morale value to our own troops and the good that it did the AAA to actually fire from front line positions was worth the effort.

Summary

For the initiation of a harassing program, a definite purpose should be established. In this case, the Battle of the Bulge was being fought to the south. The line of American troops in the north was being held very thinly, as evidenced by a cavalry group being called upon to relieve an infantry division. It was the aim of the higher command to keep as many of the enemy troops on our front as possible, in order to prevent the German command from sending them to the south to reinforce the enemy in the bulge. Harassing not only held enemy troops on our front, but kept them in such a condition that they were able to inflict far fewer casualties when the crossing actually was made.

The harassment program was highly successful in concealing the direction of the main attack on the Rhine. The American forces were scheduled to cross at Wesel, but the harassment indicated that the crossing would be made just south of Düsseldorf. In order to reinforce his front where the harassing program was carried out, the enemy was forced to withdraw crack paratroops from the north where the Allied attack actually occurred.

*Executive Officer, 11th Cavalry Group.

Cavalry in River Crossings*

ABOUT a battalion of German infantry, supported by about eight artillery and mortar batteries, defended the line Hill 105.3—Hill 102.6 (see sketch).

Our cavalry division, after completing a 70-kilometer march, had assembled in the woods north of Dymarka by 1200. The division's mission was to force a crossing of the Dnieper in the Dymarka-Nedianchichi sector, and, by attacking north along the right bank, to establish and widen a bridgehead, thus securing the crossing of the corps.

The right bank of the river with its low hills, swamps, and thick shrubbery enabled the enemy to maneuver his reserves in the depth of his defenses. The left bank, sloping in places, was also overgrown with shrubs. In the sector designated for the crossing, a small river, the Krivaia, joined the Dnieper. Because of this, it was possible to concentrate here a large number of crossing means. The irregular bank with numerous indentations was also overgrown with shrubs, and this facilitated the outfitting and preparation of troops.

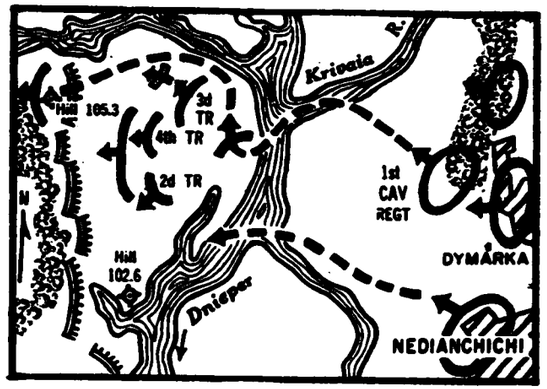
The river was up to 800 meters wide, and its current was between one and a half and two meters per second. Thus, a raft with a load capacity for a squad would cross the river in about 40 or 50 minutes.

To capture a bridgehead on the opposite bank, the commander decided to use a strong advance force composed of a cavalry regiment and mortar and antiaircraft batteries. It was to be supported by the entire artillery. The bridgehead was to be established in the area east of Hill 105.3—Hill 102.6. The crossing was to be made west of Dymarka in the evening of the following day, and without artillery preparation. The artillery and heavy machine guns had to be made ready for night firing, which was to start on signal from the advance-force commander. The 4th Troop was to cross the river in one trip. It was charged with providing security for the crossing force, clearing the right bank of the enemy in the area of the crossing, and reconnoitering his defenses in depth.

This decision of the division commander was made in conformity with the situation. The Germans defended the river in considerable strength and had powerful fire support. Only a strong advance force could destroy the enemy's combat outposts, wedge into the main line of resistance, and capture and consolidate Hill 105.3, thus securing the crossing of the main forces of the division.

The regiment was to cross at night so that it could attack the enemy in darkness before dawn. This insured the secrecy and surprise of the action. For the same purpose, it was decided to do without artillery preparation. Artillery fire was to be employed only for the protection of the landing and the advance.

Military Review. Translated and digested at the Command and General Staff School from a Russian article by Colonel I. Baev in *Krasnaia Zvezda* (Red Star) July 3, 1945.



The division had 210 Iolshin bags [probably special inflatable bags for crossing operations.—Editor]. These were used to build 27 rafts with load capacities ranging from 300 to 1,300 kilograms. Thirty more rafts of similar capacity were built from crossing materials obtained locally. The rafts were supplied with ropes to be used for pulling them upstream on their return trips.

The crossing was very carefully organized. The paths leading to the crossing points were staked. The troops moved from the departure area in small groups along specially marked lanes, with road markers stationed all along the way. This secured their speedy and simultaneous arrival at the crossing point.

Two oarsmen were detailed to each raft, and one company-grade officer (sapper) was placed in charge of each 10-to-15-raft group. All raft and raft-group commanders were informed where to load the rafts and where to land on the other side. In order to avoid mixing the crossing units, various terrain features on the right bank of the river were used as reference points.

The troop started moving from its departure area when darkness set in. Marching in absolute silence, it reached its embarkation point southwest of the Krivaia River. By this time the sappers had prepared 17 rafts and nine boats. It took 20 minutes to load the troop. Each raft was accompanied by two sappers who were to bring the rafts back.

The rafts and the boats were now out in the river. Low visibility helped conceal them. In 45 minutes the troop had crossed the river and halted within 40 or 50 meters from the bank. The men jumped off and waded ashore. The German combat outposts were not prepared for the cavalrymen. In a brief engagement the enemy was almost completely annihilated. Having reached the southeastern slopes of Hill 105.3, the troop dug in and sent a signal to our side of the river.

At this time the German mortar batteries opened fire on the rafts and boats stuck on the shoals. Simultaneously, heavy machine-gun fire from Hill 102.6

destroyed eight rafts and two boats. Our artillery, however, firing from the east bank, neutralized the enemy's mortars and machine guns.

The second troop with two mortar platoons started crossing over an hour and forty minutes later. This group used two small pontons, eight rafts made from Iolshin bags, and 12 rafts built of locally available materials. Upon reaching the shrub-covered area three kilometers northeast of Hill 102.6, the troop was counterattacked.

A strong wind slowed down the rafts on their return trip. The third trip, therefore, was delayed a little. This time it was the 3d Troop with a platoon of 45mm guns and one of 82mm mortars. The crossing equipment consisted of a raft made of two pontons, 12 small rafts (Iolshin bags), and seven boats and seven rafts built of local materials. The troop crossed the river and reached the shrub-covered area two kilometers northeast of Hill 105.3, where it was also counterattacked. This counterattack was supported by artillery and mortars, and by machine-gun fire coming from Hill 105.3. But with the support of our artillery firing from the left bank the troops repulsed the counterattack.

By dawn the whole regiment had crossed the Dnieper and had reached a nameless hill 500 meters east of Hill 105.3 and had dug in.

The 2d Regiment started crossing at 7 o'clock in the morning. The German mortar fire continued and was later augmented by aerial bombing. In spite of this the regiment reached the right bank, assaulted the enemy defending Hill 105.3, and soon captured it. During the night the regiment repulsed several German counterattacks. Meanwhile, the 3d Regiment's crossing was going on according to schedule.

Units of the adjacent infantry division crossed north of the cavalry. Both the divisions attacked and, repulsing counterattacks, succeeded in clearing a bridgehead 15 kilometers long and eight kilometers deep.

What lessons were learned in this crossing? First of all, it showed once more that it is possible for cavalry to cross a wide water barrier employing crossing means improvised from materials found in the vicinity of the crossing. It also proved that it is essential to become familiar beforehand with the nature of the water barrier, the surrounding terrain, and the character of the enemy's defenses.

All crossing requirements must be figured. When crossing materials are not available in sufficient quantity or cannot be delivered in time for the crossing operation, a scouting party is immediately organized to find such materials in the surrounding country.

The correct selection of the crossing point is very important, particularly when there is an insufficient number of supporting means and heavy artillery pieces or a shortage of ammunition. If this is the case, flanking and oblique fires from machine guns, mortars, and artillery are organized over the crossing front. These fires should prevent the enemy from counterattacking the units crossing the river. Stretches of the river bent in toward the attacker are most favorable for such fires.

When crossings of broad rivers are forced with the use of local materials only, the operation should be carried out at night with or without artillery preparation, depending on the situation. Night crossing without artillery preparation is possible only when the enemy's defenses are weak and when they are located far from the opposite bank. In all other cases, crossing at night or before dawn should be preceded by artillery preparation, and the crossing of the first echelon should be completed by dawn. This is done to enable the troops to engage the enemy during daylight.

If the enemy has been disorganized and has not had time enough to consolidate his positions, the river should be crossed immediately by the advance echelon, which will use organic and local crossing materials.

If the main line of resistance is far from the river and the latter is defended by combat outposts only, the crossing should be carried out at night. During the night, the outposts should be knocked out, the main body of the division crossed, and contact with the main line of resistance established. The assault should start at dawn after an artillery preparation.

In instances when the attacking troops have a considerable artillery superiority, it is to their advantage to start crossing the river before dawn so as to enable the first combat echelon to complete the crossing in darkness. The subsequent crossing and the development of the attack are made secure by the support of the artillery and air force.

The element of surprise is the most important factor in the success of river-crossing operations. This is achieved by secrecy of preparations and by demonstration action (dummy crossings). For the same purpose, it is recommended to cross over on a broad front and simultaneously from several points. Narrow-front crossing and the use of a single point for crossing are to be avoided by all means.

All enemy fire means near the river or flanking it should be neutralized by the time the crossing begins. It is also important to protect the crossing area by all available fire means, including antiaircraft artillery and airplanes. Once the crossing is begun, it must be continued with energy, persistence, and resoluteness. If the crossing is held up at one point, it must be shifted to the point where it is more successful. No crossing should be repeated where it has failed.

Cavalry horses, even well trained, cannot swim across a river which is 500 or more meters wide and has a medium current. In the above example only three horses out of the best five selected swam across.

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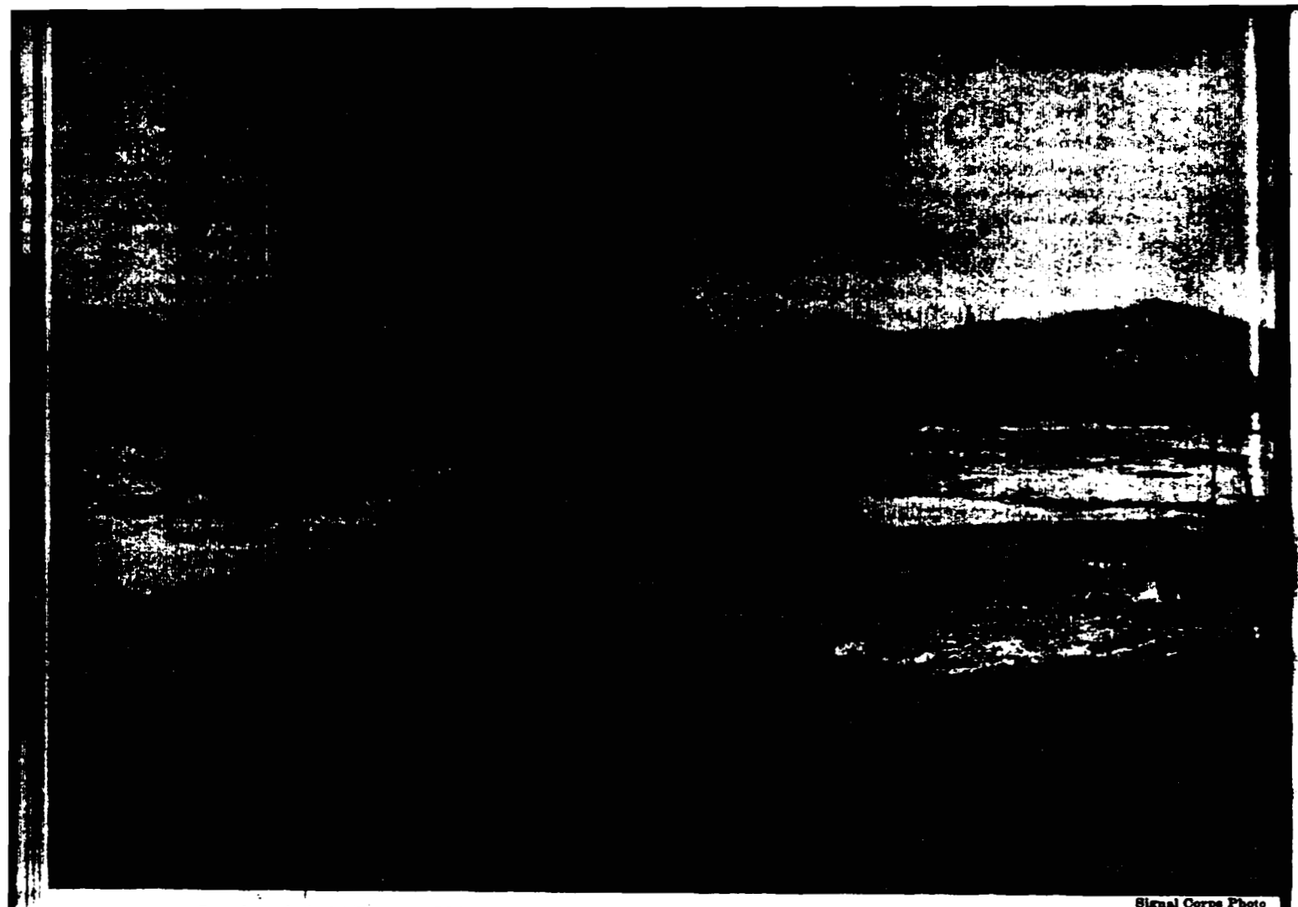


Signal Corps Photo

Leaving their LSTs near Okinawa, "alligators" head for Ie Shima, a few thousand yards from the main island.

The Kwajalein Operation

ON its arrival at a camp 30 miles northeast of Honolulu in December, 1943 our amphibian tank battalion joined in the preparations that were being made for an assault landing. The battalion was attached to the 7th Infantry Division, then in training for an amphibious assault in the Central Pacific.

Less Company D, which had been attached to the 27th Infantry Division, the battalion bivouacked for two days near the camp, which at the time was so crowded with units in training that room was not immediately available.

The division's original plans had not called for the use of amphibian tractors, but reports from the Tarawa and Macon Islands campaign indicated that the assault troops should be transported ashore in them in order to insure the complete success of the operation. Few tractors, and no trained personnel were available, however, and so provisional tractor groups were formed from the three antitank companies of the division's three infantry regiments. Operation plans were made, and an intensive program was inaugurated, for there was little time for training before the coming operation.

Organization and Equipment

The formulated provisional amphibian tractor battalion consisted of 4 provisional tractor groups, one amphibian tank company, and a headquarters and headquarters detachment. Three of the provisional tractor groups were to be formed from the antitank companies, and one was to be made up of personnel from the battalion. Each group was composed of approximately 150 men and equipped with 34 tractors. The tank company was to have 17 tanks.

A tractor battalion en route to this area began to arrive, and with their vehicles made available, each company was equipped with 14 LVT A2s and 20 LVT 2s. The A2s were to make up the first, and a part of the second waves. A company, composed of two platoons of 17 tractors each, would be transported on two LSTs.

*Commanding Officer.

Each platoon was broken down into two waves of 8 tractors each, leaving one extra tractor to serve for command or air-ground liaison. Each company then was composed of 4 waves of 8 tractors—each with two free additional tractors—and was set up to carry the assault troops of one battalion. The battalion was to be loaded on 9 LSTs, 8 of which would carry tractors, and one tanks.

The heterogeneous nature of this provisional battalion made it quite difficult to ready it for embarkation. But so little time was left that everyone concerned coöperated, and in 8 days the part of the unit that was to accompany us had completed training and was supplied with vehicles and equipment. The other provisional LVT groups also had been supplied.

A shortage of 500-series radios had created quite a problem in the communication plan. Originally each company command tractor and each platoon leader was to be equipped with an SCR-508, and each wave leader with an SCR-510 radio. Since the amphibian tanks already were equipped with Navy TCS-5 radios, however, it was planned to use them for tank company communication. Four SCR-510s finally turned up and were parcelled out to the tank company, which gave the company commander and each platoon leader one in addition to their TCS-5. It was necessary, however, to use the TCS-5 for intraplatoon communication.

The battalion was assigned 6 FM channels for use by battalion command and company, and one CW channel for the tank company platoons. Another channel, the LVT common, was later assigned personnel who had anything to do with the control and landing. This later proved the most useful channel in the operation and made it possible to talk to practically any person or unit. Communication during this operation was excellent, considering the limited time for radio installation. During the operation the commanding officer was constantly in contact with at least one or two radios in each company.

The built-in intercommunication system on the vehicles was not adequate because it was impossible to use army equipment with naval installations. It was necessary to completely re-wire the vehicles for army microphones and headsets. All electrical equipment was water-proofed and gave little or no trouble.

A number of modifications were made to the vehicles and equipment. Two .50 caliber machine guns were mounted on the cab rail, and shields were improvised for the protection of the gunners. Sandbags were also placed on top of the vehicle as added protection for the crews. A .30 caliber machine gun was mounted on each side of the vehicle. Flame throwers (which later became waterlogged and useless) were installed.

The crew of the LVT A2 was made up of 7 men, including a driver, an assistant driver, 4 machine gunners and a tractor commander. The LVT 2 crew was made up of three men—a driver, an assistant driver, and a vehicle commander. Since the weapons of the LVT 2s were not to be fired except at point targets and on direct orders from an officer, the infantrymen in the vehicles were to man the guns. The crew of the LVT A1 was composed of 7 men—a driver, an assistant driver, two scarf gunners, a 37mm gunner, a tank commander, and an extra man who would serve as an ammunition passer or a replacement for any crew member who became a casualty.

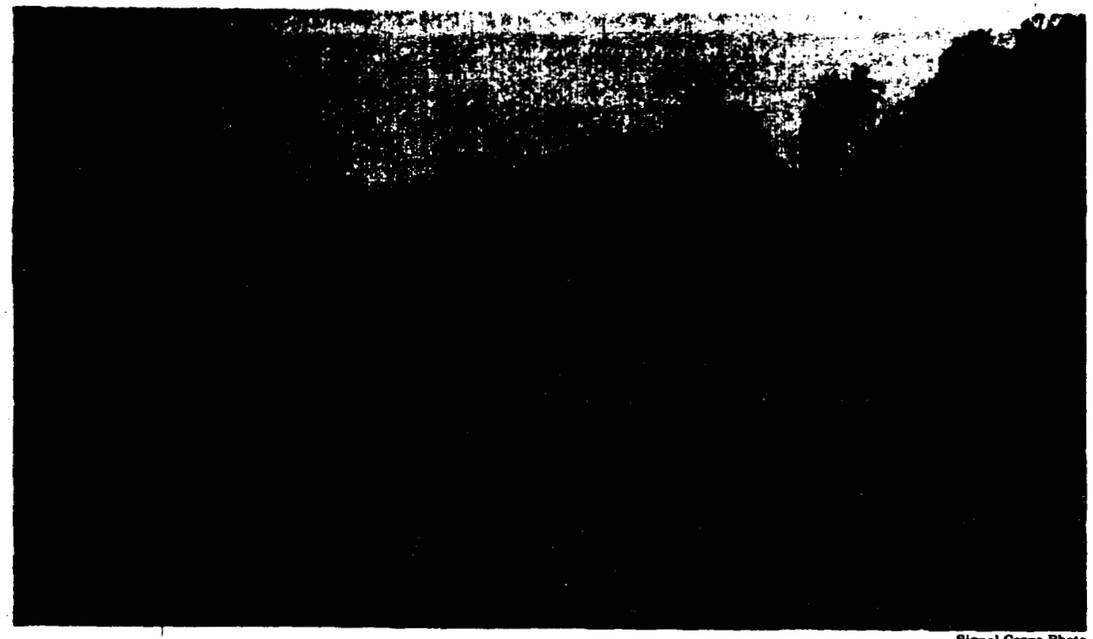
Practice Landings

Practice landings were carried out day and night as the provisional group rehearsed for the assault. The group carried the same infantry battalion it would in the actual operation. In the final training phase a series of landings were made with both single battalion and two battalions abreast. These landings were set up and carried out according to the D Day and D-plus-1 Day schedule. Firing was conducted in the final landing.

The first wave was to be made up of LVT A2s flanked by platoons of amphibian tanks echeloned to the right and left. If two assault battalions were used a

When coral reefs prohibited a closer approach at Guam, "alligators" were refueled 200 yards from the beach.

Signal Corps Photo



Signal Corps Photo

Amphibians move in on Morotai Island following its bombardment. Note smoke on shore from bursting shell.

wedge formation was to be employed. The force thus would obtain the fire power from all machine guns on the tractors as well as the 37mm and machine gun fire from the amphibian tanks. The tanks would also provide flank protection for the assault waves.

The provisional battalion issued all personal equipment and supplies for the initial assault landing. Division issued all other supplies. It was contemplated that the LVTs would return to the LSTs after each landing. Division therefore loaded emergency supplies on each LST so that tractors, tanks and crews could refit aboard the vessels. Four of the LSTs that carried tractors were stocked as floating supply dumps for assault troops who had gone ashore. On these LSTs two layers of ammunition were placed on the tank deck, and the tractors were carried on top of it.

Four of the 9 LSTs were to provide maintenance, and were equipped with second echelon tool sets plus all the spare parts obtainable. Personnel of the battalion maintenance platoon was divided among the 4 LSTs, each of which also carried two men from the attached ordnance department. In order to make available a motor park and a center for the rehabilitation of disabled vehicles the battalion also carried 21 replacement vehicles and crews on an LSD. Fifteen of these vehicles were LVT 2s and 6 were LVT A1s. The vehicles, crews, and the battalion rear command post were to be unloaded immediately.

Final Rehearsal

Preparations continued for the final rehearsal. The Navy furnished a schedule for arrival of the LSTs off the loading area. After all beaches had been sounded and reconnoitered for coral reefs, it was decided to load two LSTs at a time at beaches 5 miles apart. Five were loaded and then bad weather damaged two and delayed loading the last four. The battalion proceeded to the rehearsal area, leaving the executive officer to bring up the 4 stranded vessels, which arrived in time.

The rehearsal consisted of a number of landings that duplicated the formation and tactics contemplated for the pending operation. These landings covered a three-day period and brought out many unforeseen mistakes which were soon corrected.

On the last landing the LVTs remained ashore for an 8-hour period of maintenance. By 2400 all vehicles were reloaded on the LSTs and were en route to Pearl Harbor. The assault troops, who were on the transports, continued to another island for firing exercises which included familiarization with overhead fire.

Upon the arrival of the LSTs in Pearl Harbor on the 15th all troops debarked and went to their permanent camps for rehabilitation. A small detachment was left aboard to complete maintenance and resupply all vehicles.

En Route to Target

On January 19 the LSTs left for the target area. The transports followed on January 21.

En route to Kwajalein small details were ironed out. Numerous maps, aerial photographs and mosaics of the Kwajalein Atoll were available. Classes on orientation

were conducted. The ship's radio kept all personnel informed on the results of the naval and air strikes which were taking place the final few days before D Day. Following each strike new intelligence information and aerial photographs were distributed to all command elements for further study. After the final important briefing of staffs, we arrived off Kwajalein on the morning of January 31.

Kwajalein Atoll, the central and most westerly of the Marshall Islands, consists of a series of flat coral islands all connected by underwater reefs. At its furthest points it is approximately 70 miles long and 30 miles wide. The atoll consists of two main islands: Roi in the northern sector, on which was situated the only airstrip, and Kwajalein in the southern sector. Kwajalein Island, largest of the group, is approximately one and one-half miles long and 1,500 yards wide at its furthest points.

The task force consisted of three main groups: the northern landing force, the southern landing force, and a floating reserve. Three strikes were to be made simultaneously: one by the Marines in the north sector of Kwajalein Atoll, one by the army in the south sector, and the third by one battalion of an infantry regiment against Majuro Atoll, located approximately 300 miles southeast of Kwajalein. (The occupation of Majuro was made unopposed. In fact, there were only two Japs on the island, all dressed, packed, and ready to surrender.)

In the southern sector, a division reconnaissance company was to have landed in rubber boats on two small islands that guarded the passage into the lagoon. The company landed too far to the north, and missed one of the islands, but the mistake soon was corrected. The landing was opposed by about 30 enemy troops.

The capture of Carlson Island was considered the key to the operation because on it 5 battalions of artillery were to be set up to support the landings on Kwajalein Island. It was hoped Carlson would soon be secured so that the Kwajalein assault could go in on D-plus-1. Plans for taking the remaining islands in the atoll would be dependent on the tactical situation after Kwajalein's capture. The operation against Carlson, and also Carlos Island, called for simultaneous landings on each by an infantry battalion which would be carried ashore by one LVT Group.

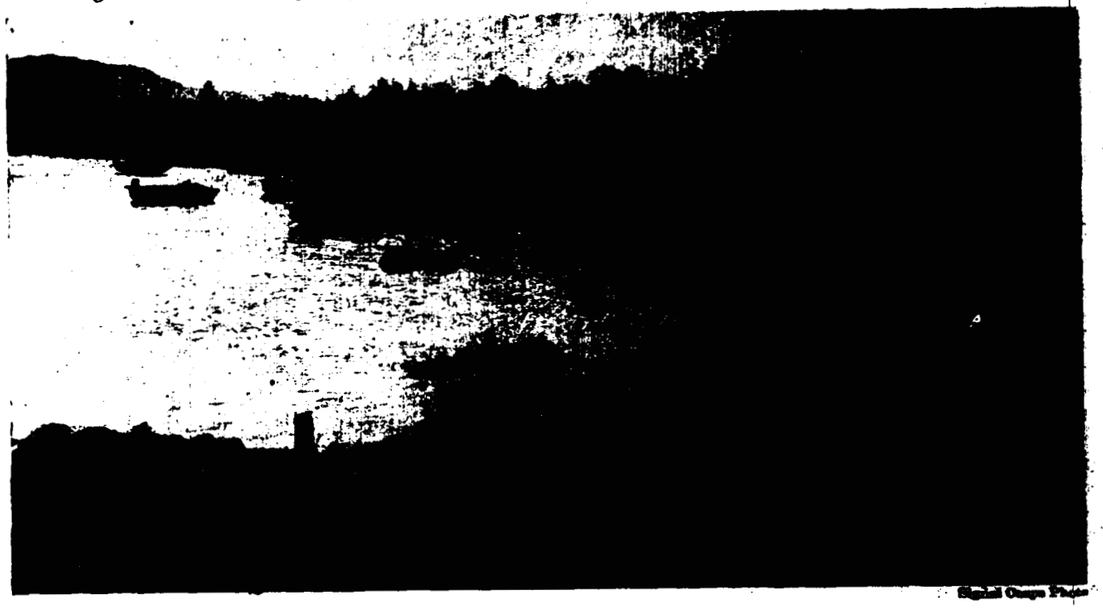
Mechanics of an Assault Landing

The landing beach on Carlson Island had come under considerable prior attention. It had been accurately surveyed by submarines, aircraft and naval ships during the preliminary strikes, and azimuths had been taken to prominent objects ashore.

A reconnaissance of the beach had been made by a naval hydrographic party. During such work, usually carried out at low tide, and preferably at night, the area from the line of departure to the beach itself is cleared. All under-water obstacles, either natural or man-made, are removed or marked. Flags are used to mark boat lanes and all under-water objects which are not removed. Therefore, LVT personnel should be thoroughly acquainted with naval flag insignia.

In preparation for the strike against Carlson Island, the LSTs rendezvoused with the transports approximately 8 miles off Kwajalein Atoll. Here they took

"Alligators" are shown congesting the beach at Guam Island. *Note edge of shell crater in near foreground.*



Signal Corps Photo

aboard the troops who were to be carried ashore in their LVTs. At the same time, the control party was transferred to the senior control vessel, which then went to its position on the line of departure off the landing beach. By radar, the control ship placed itself in its exact position on the line of departure, which was 2,000 yards off shore, and the senior control boat took position on the left flank of this line. As a marker for the boat lane, which was approximately 600 yards wide, a sub-control craft (LCC) took its place on the right flank of the line of departure.

When the troops had been transferred to their proper LSTs, the vessels proceeded to their rendezvous area, which was about 1,000 yards in rear of the line of departure. Here the naval wave guide-officers met the waves carried by the LSTs and guided them to their assigned rendezvous area in rear of the line of departure. Each wave guide-boat flew a wave numeral flag, so that waves could be identified by the control personnel aboard the senior control craft.

The control party, carried by the senior control craft, usually consists of the senior naval control officer, responsible for the dispatching of the waves and all future traffic in and out of the beach; the assault troop commander, or his representative, who is vitally interested in the mechanics of the landing, which involves both his troops and their supplies; the unit supply officer, or his representative, who is responsible for the supplying of all assault troops ashore; and the LVT commander, or his representative, in command of the LVTs that are carrying the troops ashore. Here is a team that controls all phases of a landing operation, which are placed together to facilitate decisions on all landing problems. Each of these persons, as a rule, supplies his own communication equipment, but equipment aboard the control boat is available as a supplement.

From the line of departure, to which the waves had been guided, the LVTs were to be launched at a specific time. As H Hour approached the senior control officer raises the Number 1 Flag. This readies the first wave for departure. At the proper time, the 1 Flag is executed, or lowered, and the first wave moves across the line of departure. It is flanked on one side by its naval wave guide-boat, and on the other by the sub-control craft, which will guide the wave to the beach and go in close to the shore in order to obtain information on reef and general hydrographic conditions. The sub-control craft then returns to the flank of the boat lane, and out of range of small arms fire, where it sets up a rendezvous area for the tractors after they have unloaded ashore. This rendezvous area is used for the transhipment of troops from LCVPs to LVTs in the event the LCVPs are unable to land troop loads directly onto the beach. As subsequent assault waves are dispatched, they are guided in to the beach by their wave guide-boats, unload their troops or supplies, and then return to the rendezvous area. After completing their work, the naval wave guide crafts report back to the control boat and either are sent back to their mother ship or kept as tenders with the control boat.

Landing Goes In

In the landing on Carlson Island the first wave consisted of 8 LVT A2s flanked by two platoons of amphibian tanks. Its mission was to hit the beach, unload, and then move inland approximately 100 yards where it was to set up a perimeter defense for the protection of the landing of the assault troops. The subsequent waves of amphibian tractors were to land, unload their troops and return to the rendezvous area. When the troops had reorganized and tanks had been landed, the amphibian tractors and tanks were to be relieved and returned to the water.

As the action actually occurred, the lack of enemy resistance permitted the first wave to move rapidly inland to the appointed position. Here it waited until the infantry arrived and took over. It then pushed forward across the island to take one-third of it before finally setting up its defensive line. It then was relieved by land tanks and returned to the beach area. The landing on Carlos Island was carried out in the same manner, except that there were no amphibian tanks attached to that assault battalion.

In the landing on D Day, two LVT groups were used. Without vehicular casualties, they had carried the assault troops ashore, returned to the rendezvous area and transported other battalions in and had been reloaded on LSTs by 6 o'clock.

At 4 o'clock on the afternoon of D Day, 4 LVTs carried a naval hydrographic party on a reconnaissance of the proposed assault beaches off Kwajalein Island. These vehicles met light small-arms fire but returned without casualties.

By 6 o'clock that evening both Carlson and Carlos Islands had been completely secured, and the artillery had been set up and registered on Kwajalein Island. Approximately 120 enemy had been encountered.

On the afternoon of D Day, all replacement vehicles, crews, the ordnance detachment, and the executive officer with the rear CP were sent ashore on Carlos Island to establish a motor park.

The Kwajalein Landing

The following morning the Kwajalein assault took place. The assault troops consisted of two infantry regiments which landed abreast, each regiment in column of battalions. Four assault battalions were loaded in the 4 LVT groups. The first wave was furnished support by the tank company with a platoon echeloned on each flank, and a platoon, with company headquarters, in wedge formation between the two assault battalions. The landing was made on schedule under heavy small arms fire.

By 12 o'clock the tank company had been released and loaded. The tractor groups, having to tranship and carry ashore the reserve battalions, were not released till

after dark. It was impossible for the LVTs to distinguish their proper LSTs, which caused many to be temporarily lost. A complete accounting was not obtained until the following morning. The remainder of this day was used for rehabilitation of men and vehicles. By 12 o'clock all LVTs had either been landed on Carlos Island or were loaded on LSTs just off shore. Vehicles needing major repairs were sent ashore on Carlos Island and replacements were sent out to the LSTs.

The assault on Burton Island was made on February 3 by two assault battalions of infantry which were transported by two LVT groups. During the action, a tank platoon captured two small adjoining islands. The following day one LVT group was divided and each half carried assault troops ashore on either Blenkenship or Burnett Islands. On February 5, three LVT groups each carried a battalion of infantry ashore on Berlin, Beverly or Bennett Islands. On the same day a fourth LVT group and two platoons of amphibian tanks were loaded on two LSTs carrying 11 tractors, 6 tanks and two companies of assault infantry. The mission of these two task forces was to proceed up each side of the lagoon and to land on and occupy the remaining islands in the southern sector of the atoll.

By February 6 all islands had been completely secured. The estimated enemy dead was 4,500. During the action, the provisional tractor battalion's losses were one man killed, and about 25 wounded and no permanent vehicular casualties.

A practice by which groups were kept at full strength and were always prepared for the next day's assault was to move all LSTs to the vicinity of Carlos Island at the end of each day's operations. At this point vehicles and personnel could be completely resupplied, and any vehicles needing major repairs could be sent ashore and replaced with replacement vehicles complete with new crews.

Upon completion of the operation, all vehicles were moved to Carlos Island, unloaded, and rehabilitated as well as possible with what material was at hand.

The Eniwetok Operation

At the conclusion of the Kwajalein operation our amphibian tank battalion (less one provisional LVT group, and all replacement vehicles and crews) was attached to a tactical group for the operation against Eniwetok, 300 miles to the northwest. All LVTs were assembled ashore and the vehicles in the best condition were selected. All others and their crews were to return to the Hawaiian Area.

The tactical group was a Marine headquarters provisionally set up to command the ground forces in the Eniwetok attack. The amphibian tractor battalion was to carry in assault troops in all scheduled landings.

As described in the preceding article, this battalion was a provisional one made up and trained for a specific mission, and using prescribed formations. The assault battalions of this task force had likewise been specifically trained, but used their own prescribed formations. These were put together, and based upon naval assault boat tactics. Personnel had little or no training with LVTs. It was finally decided to adopt new formations, and to carry out the assault missions as prescribed by the infantry assault battalions.

Preparations

This necessitated a reorganization of the battalion. The three provisional companies were reorganized into two, so that each company had a total of 51 LVTs, 28 LVT A2s and 23 LVT 2s. The tank company, which remained unchanged, was composed of 17 tanks. The battalion headquarters set-up was not changed.

The communication plan for this operation was about the same as for Kwajalein. A rear command post was set up on the command LST from which the executive officer could communicate with me as well as the LSTs, since each one was equipped with a 510 radio. These radios were to be used for communication while the battalion was loeded. My 510 was replaced with a 610 and one channel set up on the LST common channel.

The Kwajalein supply plan was followed, and an emergency load of rations, fuel, water, ammunition, etc. was placed on each LST so that it would provide a floating base. Supplies could be replenished from the dumps on Carlos Island.

The Kwajalein operation had ended February 6, and on the same day reassignment had been made to the tactical group for the Eniwetok assault. By February 9 all preparations had been completed—including rehabilitation, reorganization, and supply replenishment—and the battalion had been loaded. On February 11 the LSTs left Kwajalein, and on the 13th the transports sailed. D Day for Eniwetok was February 17, H Hour at 0830.

During the interim, the company commanders had talked to all personnel of the battalion and explained to them the capabilities and limitations of LVTs, the formations to be employed, and the tactical use of these vehicles. Complete sets of orders, maps and aerial photographs had been furnished each commander down to and including platoon leaders. The battalion had been briefed on the general situation as well as their own specific part in the operation.

The operation against Eniwetok had originally been scheduled for May, but an attack at this time appeared opportune for a number of reasons. The Kwajalein operation had progressed very smoothly and had not necessitated the commitment of the floating reserves. The naval reconnaissance had reported increased activity both from the airfield and on the atoll's defenses.

Enemy reinforcements also were reported being sent from the Marianas to strengthen the defense of their remaining atolls in the Marshalls. If Eniwetok was captured now while all was in readiness, preparations would not have to be made over again later. It also would be a greater surprise to the enemy, and, if it could be captured before reinforcements arrived, the job would be less costly in manpower.

Eniwetok Atoll is the westernmost atoll in the Marshall Group. It is oblong, approximately 35 miles long and 20 miles wide at its furthest points. There are three main islands, Anigebe, Eniwetok, and Perry, none of which are much more than a mile long and 1,000 yards wide. Intelligence reported approximately 3,000 enemy troops in the atoll.

Just after daylight the task force entered the two known passages on the lagoon side of the atoll. The LSTs, preceded by mine sweepers and escorted by destroyers and cruisers, entered the western passage and moved up the lagoon to a transport area about 5 miles off Anigebe Island. At approximately the same time, the transports, preceded by mine sweepers and escorted by destroyers, cruisers and battleships, entered the southern passage and continued to the transport area.

The plan of attack had been drawn up as follows: at H Hour on D Day an amphibian corps reconnaissance company was to land in LVTs on the small islands flanking Anigebe Island, on which artillery was to be emplaced to support the main landing. The capture of these islands also would keep the Japanese from infiltrating to the flanks and making counter-landings during the assault on Anigebe. No resistance was met, and by 1800 on February 17 the artillery was in position and registered on Anigebe Island about one and one-half miles away. On D-plus-one, two battalions of Marines were to land abreast on Anigebe with the mission of securing the airfield immediately, and the island as soon as possible.

On D-plus-X (it was hoped that X would be 2), the two battalions of an infantry regiment were to land simultaneously on Eniwetok Island and Perry Island. One battalion of Marines was to be alerted as a reserve for these two landings. This was as far as specific plans had been made, and the capture of the rest of the atoll was to be carried out as the tactical situation permitted.

Excellent air photographs of Eniwetok and Perry Islands showed that all ground installations had been destroyed. Since there was no visible sign of occupation, it was believed that possibly the two islands had been evacuated or were held by a relatively small enemy force. This proved to be incorrect. *(If properly used, nothing surpasses air photographs for orientation and interpretation of ground installations, but they should not be used as the last absolute evidence in planning a tactical assault. They show all exterior installations, but underground installations seldom can be seen.)*

On the atolls prior to Eniwetok, American troops had encountered enemy garrison forces consisting of naval personnel, falsely called Imperial Marines. Nowhere in Japanese T/Os have Imperial Marines been indicated as an organization. It is believed that such naval personnel were mainly base construction troops, and stranded sailors whose ships had been sunk. At Eniwetok an entirely new enemy was met—the army. It was the first time in the Central Pacific area that Japanese army troops had been encountered, and they fought with organized defenses and withdrawals, rather than with Banzai attacks that pitted swords and hand grenades against tanks.

The reconnaissance company landed unopposed on the islands adjoining Anigebe, and by dark on D Day the artillery had been landed and was registered in. All during that night naval gun fire pounded the defenders of Anigebe Island. At dawn on D-plus-one the reinforced marine regiment was ready for the assault.

Anigebe Island is 1,500 yards long and is shaped like a triangle. The Japanese found the island not quite long enough for an airstrip that would accommodate the larger types of planes, and to remedy this they had added a cement extension to the airstrip which they had built on the north edge of the island. This cement abutment extended out 100 yards into the lagoon, its top about 8 feet above the water. Along its sides pillboxes had been constructed to provide perfect fields of fire into the lagoon. The landings was to go in on this side of the island on a strip of beach 1,000 yards long, in the center of which was a pier.

The morning of D-plus-one was overcast, a strong wind was blowing and the current was moving at about 4 knots across our front. The control boats, whose duty it was to form the line, had been late in arriving, and when the LSTs came into position to launch the LVTs the line of departure had not yet been established. Consequently, by the time all LVTs had been launched they had drifted about 500 yards to the flank of the line of departure. Steps were taken immediately to move the LVTs to their correct position, and soon the first wave, followed by its successors, were en route towards the beach, flanked by their naval guide boats.

The Assault Landing

For some time prior to the dispatch of the assault waves, destroyers, cruisers and battleships were busy pounding the beach area with everything from 20mm to 16-inch guns. The supporting artillery—a battalion of 105mm howitzers and one battalion of 75mm pack howitzers—also was laying down its barrage. Naval aircraft took part, hitting the beach area with 100 and 500 pound bombs and rockets.

Upon crossing the line of departure, the first wave was preceded by LCIs. These craft fired into the beach with 20- and 40mm rapid fire weapons and, when 1,000 yards off shore, launched their vast number of rockets, which swished in and exploded with devastating effect. The LCIs led the first wave toward the beach until forced to pull off to the flanks, from which

point they continued to support the landing. Their move cleared the front ahead of the first wave which, when 500 yards from the shore, opened up with its large number of 37mm, .50 and .30 caliber machine guns. The succeeding waves fired when ordered by an officer, and then at only point targets.

The first wave continued to fire through the blanket of dust and dirt which covered the beach area. On the morning of February 17 this cloud of dust so obscured the island that it prevented the naval guide-officers from seeing their land marks ashore. This, coupled with the wind current, caused them to land about 300 yards north of their scheduled beaches. The result was that the assault battalion on the left flank landed at the end of the cement abutment from whose pillboxes a withering fire was sent into the troops as they climbed up on top of the flat airfield. The LVTs soon closed under the abutment, and reached a dead space out of the field of fire. It then was comparatively easy to neutralize the fortifications by hand grenades lobbed up into the pillboxes.

The amphibian tank platoon, coming in echeloned for a landing on the left flank, was forced to go in on the northern point of the island. It was a hot spot, but the platoon in a short time, and without supporting infantry, had neutralized and partially cleaned it out.

As at Kwajalein, the mission of the first wave of amtanks and amtracs was to push inland approximately 100 yards, unload their infantry, and with them set up a perimeter defense which would protect the landing of the remaining waves. After the land tanks came ashore and the infantry had reorganized preparatory to continuing the attack, the tractors composing the first wave were to return to the water rendezvous. The two flank amtank platoons, each supported by a company of the reserve battalion, were to pull off the flanks and protect them against enemy counterattacks. The center amtank platoon was to rendezvous on the beach, and the company commander was to report to the regimental CP ashore.

After landing, the mission of the two assault battalions was to push across the island as quickly as possible. The reserve battalion was to land when enough LVTs returned to the water rendezvous area to carry them ashore. The battalion, less two companies which were protecting the flanks, was to remain on the beach until called by the regimental commander when the tactical situation warranted.

The relationship of the infantrymen to the tractor crew is of utmost importance; for the infantryman, as well as everyone else, is experiencing fright while moving in on the assault. He is not only afraid of what he will find ashore, but even more afraid of the tractor in which he is riding. The tractor crews also are fearful of the work ahead but since they will unload the troops ashore and immediately return to their water rendezvous they have only half as much to fear. A tractor commander and crew, therefore, can do much to alleviate the infantryman's fears by making him realize that nothing outside of a direct hit can harm the vehicle.

Anigebe Island was secured by the Marines in 6 hours and 40 minutes. By 1700 the LSTs had re-loaded their LVTs, and were assembled in the transport area receiving the infantry regiment that was to take part in the next day's assault.

A complete enemy plan for the defense of Eniwetok Atoll had been captured on Anigebe Island. It showed that Eniwetok and Perry Islands were strong points in the defense of the atoll and were occupied by from 1,000 to 1,500 troops. It was decided, therefore, to send against it two infantry battalions in column of battalions, and to alert a Marine battalion as a reserve. The assault on Perry Island was postponed until after the capture of Eniwetok.

Little attention had been given Eniwetok because air photographs had shown its installations destroyed. An hour before the assault an intense naval and air attack was made. This failed to destroy the trees and vegetation, which provided cover from which the enemy sent heavy small arms fire against the assault troops. In contradiction to the air photographs, a cliff from 6 to 10 feet high was found about 10 yards from the water's edge. Tractors and tanks were held up until reconnaissance parties located openings through which the vehicles advanced across the island proper to carry out their normal mission. Intense opposition was encountered, however, and two days were required to secure the island.

On February 21, after a day for rehabilitation and reorganization, the assault was made on Perry Island, the last enemy stronghold in the atoll. It was captured the following day.

Of the estimated 4,500 Japanese on Eniwetok Atoll, all were killed but the few that surrendered. The battalion's only vehicular casualty in either the Kwajalein or Eniwetok operations occurred at Perry Island, when a tractor which had just transported casualties to a transport, was hit with shrapnel. Its engine cut out and it sank.

On February 23 the battalion was released from the tactical group and ordered to load on LSTs for the return trip to the Hawaiian Area.

The Marianas Operation

Approximately a month after our return to the Hawaiian Area from the Kwajalein and Eniwetok operations, a three-month training schedule was begun with the firing of individual and vehicular arms. The schedule next called for platoon and company training on land and water, and was to end with a series of bat-

talion exercises and combat firing. Mistakes noted in combat were to be emphasized.

The camp provided limited facilities and it was necessary to construct many of our own ranges. A minimum of time was to be spent firing at known distances—a maximum amount on combat courses.

Combat had shown the need for a vehicular combat course, especially for training the scarf gunners. A crude but effective course was constructed: a trench was dug about 25 yards long and 12 feet deep. Prone, standing, and kneeling silhouette targets were nailed to long poles, and volunteers carried them back and forth in the ditch, which caused them to bob and change position rapidly. Firing first was from stationary vehicles at ranges of 50 and 100 yards; the vehicles then moved slowly from the 100 yard to the 50 yard point, firing as they approached. The scarf gunners also fired a few rounds at stationary targets, and strange to say, got fewer hits on them than on the bobbing targets.

On the return from the combat zone all tractors were turned in to ordnance for rebuilding. In order to further familiarize crews with their vehicles 30 amphibian tanks were retained. Among other training, the crews—helped by maintenance personnel—tore down these amphibian tanks. Then, starting with a hull, they completely rebuilt them, cleaned them up, worked over the parts and substituted new ones where necessary. Parts that had failed during combat were given a particular scrutiny and many corrective experiments were tried. The men preferred these vehicles for the next combat to the new ones which were received for it.

On April 20, 1944, the battalion was assigned to an amphibian corps for operational control, and attached to a Marine division. Assigned to the division for the coming operation were three amphibian tractor and one amphibian tank battalions. Our battalion was to constitute the first assault wave and land in a line formation with 4 companies abreast. Each company was to have 18 amphibian tanks, making a total of 72 in the battalion. Each of three LSTs was to carry an assault company, and the fourth the battalion headquarters company. The tractors which were to transport the troops ashore were to be carried on the LSTs and one amphibian tank platoon was to be carried with each assault company. The two company headquarters tanks, and a battalion tractor were to go on the assault battalion's headquarters LST. Four LSTs, therefore, were to transport a complete assault battalion and all of its attachments of tractors and tanks.

We were ordered to load for combat, and finally were assigned the top deck of an LST for organizational equipment, which included 5 2½-ton trucks and trailers, 4 ¼-ton radio trucks, kitchen equipment, a 20-day supply of expendable items, and other impediments. All of this equipment was water-proofed, packed and loaded on time, but not without difficulty. As in the Eniwetok operation, an emergency supply of fuel, oil, rations, ammunition, etc., was loaded on each LST in the event it was necessary to use these craft as floating bases. We drew from the Marines 40 new LVT A1s which had to be processed and re-supplied with missing items.

The training program was accelerated, and vehicle training coördinated with vehicle availability. After all vehicles had been completely equipped and worked over, and before they were finally loaded, all companies conducted trial water runs of 12 miles, culminated by platoon and company firing problems on both land and water. During the runs, all phases, such as communication, control, etc., were tested. A three-day period of maintenance and equipment rehabilitation was conducted just prior to loading for the rehearsal. Our only training with the Marine division consisted of a CPX based upon the plans for the coming operation.

Five days before the final loading for the rehearsal, the battalion was issued 16 LVT A4s equipped with 75mm howitzers. Since this had been anticipated, classes within the companies had already been conducted by instructors from assault gun platoon of the old medium tank battalion. These LVT A4s were not equipped with machine guns, and in order to have tank assault gun teams it was necessary to assign them within the companies. Each company got 4 of the craft and distributed one to each platoon and one to company headquarters. The platoon leader used his as a command vehicle, as he was in a position to support either section of his platoon. The LVT A1s had an additional mission of protecting the assault gun and its scarf machine guns. Prior to loading they made a trial run and each crew fired 75 rounds from land and water.

With few exceptions the organic communication setup for an amphibian tank battalion was used. Each command tank was equipped with an SCR-508, other tanks had SCR-528s. The battalion was assigned 5 FM channels for battalion command and company channels. We were required to guard an LVT common channel, which was the common channel of the provisional LVT group headquarters and under which came amphibian tank and tractor units. Each tank company sent a liaison officer with a 510 radio and an operator to the assault infantry battalion. This liaison officer was to accompany the assault battalion commander during the assault. The battalion also furnished each regiment a liaison officer with an operator and a SCR-510 radio. This officer was to accompany the regimental commander in the assault. A 510 radio was also on the division command ship. At all times the tank company was in contact with its assault battalion, and I was in contact with the regiments as well as the assault battalions through regimental liaison officers. Complete water-proofing of all radio and inter-communication equipment was accomplished after much experimentation. Communication proved excellent during all phases of the operation.

The rehearsal, lasting 6 days, consisted of a series of assault landings in which the exact formations and tactical plans to be used in the pending operations were employed. After completing its rehabilitation, the unit

was ready to embark, and re-loaded during rough weather.

On May 19, we arrived at our base, where we spent 5 days rehabilitating vehicles and supplying the articles found missing during the rehearsal.

The task force arrived at its forward base on Eniwetok, on June 8. Final orders were issued and last minute supplies taken on, and on June 12 we left for the target area.

The Marianas are a series of islands lying about 1,200 miles southeast of Japan. The main islands are Guam, Saipan, Tinian, Pagan and Rota. Unlike the previously assaulted coral atolls these islands are volcanic in structure. The Japanese headquarters for the Central and South Pacific Area was located at Garapan, the capital, which is on Saipan. Intelligence reported approximately 60,000 enemy troops in the Marianas, 30,000 on Saipan, 10,000 on Tinian, and 20,000 on Guam.

The natives are nine-tenths Japanese civilians and one-tenth Charmaros. Since these islands had been under Spanish control until 1899, the Charmaros were a mixture of Spanish and Polynesian. Ruled by Germany until the end of World War I, the islands were then given to Japan, and at this time were being used as a staging area for the Central Pacific.

The Assault Plan

The first phase of the assault was to be an attack on Saipan by a "Northern Landing Force," and the second phase on D-plus-three was to be made against Guam by a "Southern Landing Force." On approximately D-plus-20 the assault on Tinian was to be made.

Two divisions abreast were to land on the southwest of Saipan. They would go in with two regiments in line, each regiment having two assault battalions. The landing, therefore, would be made over a 4,000 yard front with 8 battalions abreast.

The Marines, on the south flank, were to land on 4 beaches, each approximately 500 yards long. The plan was for the first wave of amphibian tanks, and the second and third waves of tractors which carried assault troops, to hit the beach and move inland, by-passing all organized resistance. They were to proceed inland for approximately 2,000 yards to the "0-1" line, which extended along the first high ground on that side of the island. Here the infantry, carried in by the first two tractor waves, was to unload, and with the support of the amphibian tank battalion, was to set up a perimeter defense to protect the landing of the remainder of the troops. The following tractor waves were to unload their infantry on the beach. It then would push forward to the 0-1 line as quickly as possible, cleaning out all enemy resistance within the beachhead perimeter. All tractors were to return to the water rendezvous after they had unloaded their troops. The amphibian tanks were to remain in support of the infantry until relieved by the land tanks.

For the continuation of the attack beyond the 0-1 line, three possible plans were devised as follows:

Plan 1—If the initial beachhead line was taken early in the day and *with a minimum of personnel and vehicular casualties*, the Marines on the left flank of the assault were to be loaded in 150 LVTs and, protected by medium and amphibian tanks, were to launch a mechanized attack on Aslito airfield. The Marines on the right would support the attack by pushing forward. Other Marines would be landed to take over the left flank area and would push forward to protect the mechanized attack from an enemy counterattack from the high ground on the north.

Plan 2—To be used if the assault troops occupied the 0-1 line *early* in the day, but had *sustained medium personnel and vehicular casualties*. It called for the landing of additional Marines on the left flank, loading them in 150 LVTs and launching a mechanized attack as described in Plan I.

Plan 3—To be used if the assault troops arrived at the 0-1 line *late* in the day *with medium personnel and vehicular casualties*. This plan called for launching on the following morning over the entire front an attack supported by medium and amphibian tanks.

The Landing

D Day, June 25, was perfect for an assault. From the division command ship, I was unable to contact my battalion by radio because of distance and interference, and shifted to the air observers net in order to follow the course of the assault. On it I followed the progress of the tanks and tractors until I went ashore at 1230 to establish contact with my companies.

Company B, which supported the 1st Battalion of one regiment, was to land on the beach, then proceed through the town of Charan Kanoa to the 0-1 line about 2,000 yards inland. As the action occurred, the men approached the beach under medium small arms and artillery fire and mounted the reef about 800 yards from shore. While crossing it two vehicles were lost, and on moving inland toward the town, two more vehicles were temporarily lost when they hung on stumps or bogged in shell holes. Company B had planned to pass through the town in line of platoon columns, reform their company in line formation, and proceed over the open ground just beyond the town to the 0-1 line. Although a small lake was known to be in the area there seemed to be a sufficient amount of hard ground to permit passage. This assumption proved incorrect. The majority of the ground beyond the town was in rice paddys which an amphibian tank could not negotiate. Plans were therefore changed. The company crossed the open ground without receiving heavy weapons fire, and proceeded in a canalized fashion along the one road leading from the town to the 0-1 line, which it reached at 1000 hours with 13 tanks. It was then ordered by the assault battalion commander to wait for infantry support. At about 1800, Company B was released to return to the beach for refueling and resupply.

Company A, in support of the 1st Battalion of a Marine regiment, was to land and proceed in line to the 0-1 line. It approached the beach under heavy small arms and mortar fire, lost some vehicles in crossing the reef, and landed. About 800 yards inland it was stopped by the rice paddys. Unable to find a way around, it tried infiltrating through, but after three or 4 vehicles bogged down, encircled the right flank of the swamp. Only 8 of its tanks reached the 0-1 line on D Day. The others were either on the reef, hung on stumps or in ditches, or had been destroyed by fire while advancing. At 1800, the company was released for refueling and resupply. At the end of D-plus-two, it had 5 tanks operating and had suffered about 50 per cent casualties, including all company officers.

The mission of Company D, supporting the 1st Battalion of another Marine regiment also was to reach the 0-1 line at a point, 1,500 yards inland. It too met heavy small arms and mortar fire while going in. Three vehicles were lost as it proceeded inland, and on crossing the open ground it came under heavy artillery fire and lost two tanks before the enemy guns could be knocked out. The company arrived at the 0-1 line at 1000 with 12 tanks, and remained there until 1800 when, less one platoon, it was released for refueling and resupply. The platoon remained on the line overnight in support of the infantry.

Company C was in support of the 2d Battalion of the same Marines. Its right flank platoon, aided by a company of infantry, was to move forward and clean out enemy installations on Aganin Point. It had partially accomplished the mission when ordered to withdraw because the area was to be covered by our own air and naval gun fire to discourage a probable enemy counterattack. The platoon remained near the beach and helped infantry personnel clean out enemy pillboxes. Seven of Company C's tanks arrived at the 0-1 line at 1000, and remained overnight supporting the infantry and returned to the beach the following morning to refuel and resupply.

By 1000 on D Day the battalion had put 40 tanks on the initial beachhead line. They were placed in defiladed positions from which they could support the infantry. Although very few casualties were suffered on the 0-1 line—since most enemy fire was directed at the immediate beach area—by the end of D Day the battalion had approximately 28 tanks operating and had had about 100 casualties. During the afternoon, additional Marines came ashore and went into a front line sector. That evening the enemy launched an armor-supported counterattack and penetrated to the beach, but the next day were driven back.

On D-plus-one Company B was attached to a regiment of Marines, and the remaining companies, with all serviceable tanks, returned to the front lines and supported infantry attacks. Until D-plus-11 the amphibian tanks continued to support the infantry, either operating with the land tanks, or supporting them by fire, or leading the attacks when land tanks were not available. During this time it was necessary to reorganize the battalion into three provisional companies in order to rest the men and rehabilitate the vehicles. Two of the companies were kept on the line and one in the battalion bivouac.

On D-plus-two, the battalion rear echelon came ashore and a bivouac area was established where all disabled vehicles were assembled for repair or salvage of usable parts. On D-plus-three, the companies were placed under battalion control and daily two of them were attached to the two assault regiments. On D-plus-9, the bivouac area was moved from the beach to a wooded area on the 0-1 line, a mile in from the beach.

The Final Phase

During the final phase in Saipan's capture, amphibian tanks were used from the water to aid the infantry in cleaning out caves along the shoreline, and also to encourage the civilians that were in the area into surrendering.

On D-plus-12 the battalion was released from further combat, alerted for the assault on Tinian, and instructed to rehabilitate as many vehicles as possible.

The assault on Tinian was to be made on two narrow beaches approximately 65 yards wide and 1,000 yards apart. Amphibian tanks were not to land in the first wave because the beach areas were known to be covered with mines. They did, however, lead the assault waves to within 300 yards of the shore, then pulled to the flanks and supported by fire the landing of the infantry from tractors.

The two available companies of my battalion were not used in this landing, but were loaded on LSTs that were lying off Tinian awaiting orders to land if needed. On July 25, Y-plus-one, one company was called ashore to support the medium tanks in an attack. The following day the remainder of the battalion went ashore, and until July 28 was used in the front lines to support and protect the land tanks in their attacks. On July 29 the battalion was released, and loaded on LSTs for the return to the Hawaiian area.

During this operation, the battalion sustained about 31 per cent personnel casualties. Sixteen tanks were completely demolished; 14 were partially demolished or mechanically disabled and shipped via LST to Pearl Harbor. The battalion loaded 38 amphibian tanks and 4 amphibian tractors for the return trip.

Should We Violate Principles of War?

by Brigadier General Hamilton S. Hawkins, Retired

AFTER every war we are too prone to regard the manner in which it was fought as a standard by which we are to fight the next one. With some exceptions, of course, our schools teach military students the tactical methods by which our victories were won. Too little consideration is given mistakes made, or standard methods which even though they were successfully applied, were not good, or at least could have been improved upon.

I

At the beginning of World War II, it was easy to predict that the Germans were going to use armored forces to the very limit. If needed, the campaign in Poland was a preview of the methods that we should have expected the Germans to use. Taking advantage of the weaknesses that they knew existed in the French and British armies, the Germans justifiably decided to make a speedy and rapid war of movement, in which they relied chiefly on their armored forces. They knew that the short Maginot Line could be by-passed, at least temporarily; that the Allied armies were not equipped with sufficient or large enough caliber antitank guns. They knew that they had superiority in the air; and that the trend in the Allied armies was to give more importance to strategic bombing by the air forces than to the tactical use in support of ground armies. They also knew that the cavalry regiments in the armies of their opponents were being mechanized, and that even if horse cavalry were retained it was not properly equipped or trained for modern warfare.

All of this led, naturally, to the German expectation of a quick victory over France, and over any other European states that might oppose them. From here on, the Germans were unimaginative. They believed that the occupation of France, Belgium, Holland, and Norway would put them in a position to defeat England by submarines and by air, and perhaps even by invasion. After the defeat of England they thought it would be easy to take care of Russia; that the use of mechanized troops would render it unnecessary to use cavalry, and that the Russian army was ill supplied and equipped, and, if necessary, could be beaten almost as quickly as that of France.

Certainly after the Polish campaign the military authorities in France, England and the United States could, and should, have foreseen what was coming. It was obvious that the German mechanized forces were going to move and fight on or near roads. It should have been obvious, therefore, that the only way to stop them was by antitank guns in great numbers, tactical air forces, and properly equipped and trained cavalry able to maneuver boldly across country. It should have been apparent that infantry, heavily supported by artillery, would remain the basic arm for both defense and attack. It should have been realized, however, that without the elements just mentioned—antitank units, tactical air force and cavalry—the infantry would be unable to stop the rush of German armor.

The Allies did not have armored forces to compare in quantity or quality with those of the Germans. What armored troops they had were used improperly. The tactics of armored troops had not been developed and, in my opinion, were not truly understood even by the American army in North Africa, Italy, and Europe during the latter years of the war.

It was thought that the absence of armored troops in the French and British armies was the reason for the German success in 1940; but this was only partially true. The elements already mentioned could have made a successful defense without armored forces. The great advantage of a large armored force, as developed later in the war, was for defensive operations after our infantry had made it possible for the armored forces to break through.

It is not hindsight at all that prompts these observations. They were manifest at the time, and were often stated. After America entered the war there were many tactical errors made that should have been avoided. Although there were many brilliant actions fought, our tactical leaders should have been, and could have been, better trained if our War Department staff and school authorities had listened to several voices that were crying in the wilderness before and during the war. It is not intended to accuse all of our tactical leaders of these errors, but there were too many of them who were guilty. Here are a few of these errors:

II

Infantry regiments were deployed for battle in a uniform, continuous line of skirmishes across all sorts of country, whether cover existed for some of the smaller units or not. Troops should not have been required to advance over long open spaces without cover. Rather

than this, the various columns should have assumed narrow fronts and greater depth so as to advance only over country that was rough, broken, or wooded enough to afford the deployed soldiers a chance to use cover skillfully, and to reach the enemy without being killed or wounded. Open spaces should have been strictly avoided. Although some casualties are inevitable, every soldier has a right to feel, after experience in several battles, that he has a fairly good chance of getting to the enemy and destroying him without being wounded or killed. The realization could have been acquired only if skillful tactical methods had been used by the leaders of both large and small units. In many cases, tactical leadership was excellent; but too often it was poor. Poor tactical leadership can be charged only to insufficient or incorrect training during the preparatory period in this country. The individual training of soldiers in the use of arms and on obstacle courses, however thorough, cannot make up for poor or inadequate training of tactical leaders.

Too often higher commanders did not allow the necessary time for commanders of combat units or groups to look over the ground on which they were about to commit their troops. This impatience came from ignorance, or from similar pressure from still higher commanders. Of course, such pressure often is necessary to overcome the lack of initiative or over-cautiousness of some subordinate commander. But too frequently it comes from sheer ignorance of what the smaller unit commander has to do to skillfully conduct the advance without too many casualties.

Troops that have been treated in this way will stand for heavy losses a certain number of times, but, eventually, they lose their morale through lack of confidence in their leaders, and because of their certainty that they have little or no chance of getting through a battle without being killed. When this occurs, it takes new leaders, and skillful and considerate handling, to restore morale.

III

Another tactical mistake, especially noticeable in the larger units, is overdispersion. For fear that the enemy may take advantage of some ground that is not occupied by our troops, either in attack or defense, some commanders of large units have spread their forces over entirely too long a front. The desirability of covering the whole critical front may be obvious, but if there are not a sufficient number of troops available to do it properly it is a serious error to attempt it. No command should be spread out to such an extent that its several parallel columns are beyond supporting distance from each other. Furthermore, provision must be made for the establishment of a suitable reserve.

Each column must have some depth, and, in addition, a general reserve must be established. If this cannot be done, the front must be narrowed until it can be, even if some of the front for which the commander is responsible is left without any troops. The front assigned may be larger than the unit can take care of as its commander might wish. The only solution is to dispose the unit into several columns or groups within supporting distance of each other, keep back a reserve, scout the vacant parts of the front with small mobile elements, and trust that any enemy forces that may venture into this vacant area may be attacked in flank.

If it is a question of defense, a command too small to cover the entire front properly must resort to delaying actions conducted to prevent any enemy of superior strength from enveloping its flanks and surrounding the command. It is certainly better to fall back, with the command in hand and fighting delaying actions, than to make a stand so prolonged that the command may be surrounded and destroyed.

The most flagrant violations of these principles during the recent war were the overextension of the II Army Corps southeast of Tunis, North Africa, in 1943; and the overextension of certain large units of the U. S. First Army in the Ardennes region of Luxembourg and Belgium, which resulted in the Battle of the Bulge.

The defeat and near disaster to our II Army Corps in North Africa apparently was due to two things: the lack of clear-cut mission, and the dispersion of the corps over a front of approximately 70 miles by direction of the British high command in that area.

General Rommel's army was halted facing General Montgomery's 8th British Army at the Mareth Line. Our II Corps was ordered to move toward the Mediterranean seacoast with the object, as far as we know, of cutting or harassing Rommel's line of retreat toward Tunis. In the first place, this was a very dangerous mission for one corps, unless it was merely to harass Rommel's line of communications and fall back in case the Germans attacked in force. There should have been no misunderstanding as to exactly what the corps was to do. In the second place, the several columns of the corps should have been kept within supporting distance of each other instead of spreading over such a wide front. No reserve was provided. All the Germans had to do was to select a point of attack along the extended front and attack it vigorously with superior forces. This they did, causing great demoralization, and severe losses in men and material. To save the reputations of the top British and American generals, the defeat was laid to the "greenness" of our troops. This outrageous slander against troops that had been well-trained—and therefore were not green, even though it was their first battle—and who fought most gallantly and efficiently under impossible circumstances against overwhelming odds, was a shameful incident, the truth of which should be brought out in our official history of this war. Never were excellent troops more mishandled and maligned. From all available information at this time, the British generals who intervened in the handling of this American corps were principally to blame. The incident should be studied as an example of the violation of the important principles mentioned above.

The initial success of the Germans at the beginning of the Battle of the Bulge was due, certainly in part, to our violations of the tactical principles discussed above. The area selected by the Germans to attack on December 16, 1944, was lightly held by American troops. This may have been entirely justifiable, as afterwards claimed by our high command. This is not the point involved, however. The fault rested not with the gamble taken to hold that area lightly, but with the manner in which the troops assigned to hold the area were dispersed.

Assuming that it was justifiable to hold the area lightly—the troops assigned for that purpose should have been kept in hand. The various units should have been kept in supporting distance of each other, and a general reserve held back, even though this would have left long portions of the front unoccupied. The vacant areas could have been scouted. When the attack came in great force, the commander of the area should have ordered his troops, not to hold at all costs, but to withdraw when their flanks were threatened with envelopment, and to fight delaying actions. This would have required the whole force to have been kept in hand instead of spread out so that the smaller units were completely out of touch with each other and there was no coördinated movement of the whole force. Delaying actions with the force in hand might not have resulted in much delay unless the troops were very mobile and could threaten the flanks of some of the German columns. The disjointed manner in which the troops did actually fight, however, effected no delay whatever, and resulted only in the utter destruction of some rather large units which might have been preserved to fight again as the resistance stiffened with reinforcements gradually brought in, as actually happened. The complete destruction of all of those troops originally holding the area was unnecessary and stupid.

Applying these same principles to the whole group of American armies, which included the Ninth, First, and Third, it must be remembered that this group was engaged in offensive operations, and gaps between them, under these circumstances, are not unnatural or necessarily due to faulty generalship. As long as each army was kept in hand, the gaps were not of serious consequence provided that a large general reserve had been established. To have proceeded without this reserve was a serious error. If there were not enough troops available to constitute this reserve, the whole front should have been shortened. It is a mistake to let the enemy induce you to overextend your forces merely because he has overextended his own. If he has so many troops available that he can cover a wider front than you, it is still a mistake to overextend your lines for that reason. Smaller armies have beaten larger ones by superior maneuvering, surprise, and good generalship. But no such success has ever been won by overextension without sheer luck, superior troops, or other factors which sometimes win despite bad generalship.

IV

Criticism of the manner in which mechanized cavalry reconnaissance groups were employed, especially by corps commanders, is justified. These squadrons were not armed, equipped, or organized to fight serious and prolonged actions, and they should not have been used on such missions. The best that could have been expected of them was to provide security against surprise and ambuscade of the units they were covering.

Mechanized cavalry was not organized to seize and hold critical points or ground until other troops could be brought up, to fight delaying actions, attack the enemy in flank or rear; maneuver in strength across country, fill gaps between large units, accomplish distant reconnaissance, or pursue across country on the flanks of the enemy. Security for other troops was the only, or almost only, mission for which they were suitable. And yet, they were called upon for other missions, which they performed as best they could, very gallantly and with heavy losses. Strong forces of horse cavalry were needed; however, had they been available it is possible that they would have been wrongly employed. The education at our service schools of our prospective leaders between World War I and World War II was not satisfactory in so far as the employment of cavalry was concerned.

V

The organization and training of a tactical air force as an organic part of our ground forces had been neglected during the 23 years between the two big wars. Just as the navy needs a carrier air force as a tactical part of a fleet, so must the army have a tactical air force as an adjunct to ground operations. American air authorities, however, considered a strategic air force of far more importance, and consequently, we entered the campaign in North Africa without a tactical air force specifically designed to work as part of our ground force command. The British RAF had made the same mistake all through the war up to that point, and we followed suit. The result was that our Allied ground forces did not receive the air support that the German ground troops did in that campaign. This was corrected only during the last operations of this campaign. In western Europe our air forces seem to have cooperated with ground troops very well, but this important element in an army should not have been left to improvization after the war began.

Conclusion

No one knows as yet how the development of the atomic bomb, robot airplanes and radar will affect the future of armies and navies. It is certain, however, that unless these new inventions of science bring about the certainty of permanent peace, armies and navies will be retained. The errors of the past, therefore, must be studied by military men, so that in the future they can be avoided.

E PLURIBUS UNUM

During the last two years or more a great deal has been written and spoken on the subject of unification of the armed forces of this government.

The problem has been discussed pro and con by our armed forces, the Congress and by the public and press until practically every argument for and against unification has been submitted. Further detailed discussion editorially in these columns would therefore only be repetition.

However, The Cavalry Journal feels strongly on the major issues. First, that the experiences of the war, and the carefully formulated statements of the country's foremost military and civilian experts, point to the inadequacy of our present organization to achieve its intended purpose. A careful analysis of the facts and figures of the past war has proven even to the most skeptical that the United States has problems which can be solved only by an overhaul of our armed forces machine. Even those who oppose the solution by unification agree to that. Second, whatever the decision is, it should be made promptly and positively. Further delay is extremely dangerous.

From an analysis of the testimony made public to date, it would appear that a majority of the opponents to unification are not so strong against unification itself as they are to the details for carrying it into execution. Of course there will be many "bugs" in the initial plans, but these so-called "bugs" will be gradually eradicated, and a feasible working plan will be formulated.

What are the problems involved in this plan of unification? In general they appear to be: (1) How to allot the proper share of the whole responsibility of military and naval defense between the three arms —land, sea and air. (2) How to amalgamate these three conceptions of mission into a joint strategic plan. (3) How to train combat units of these arms in peace to operate as a joint force in war. (4) How to obtain command and staff officers in each arm with sufficient knowledge of the purposes, methods and uses of the other two. (5) How to allot to each arm its proper proportion of the allotment of men and money and matériel set aside for military operations. (6) How to cut the cost of the armed forces' establishment to the lowest possible figure through joint procurement of common supplies and services.

Have not the experiences of the last world conflict proven that the conduct of modern war is possible only with unified command and joint operations? How then can these operations be assured?

It is a question of organization, method, technique. There is no question that, should war come, the need for command unity and smoothly functioning joint operations will be imperative.

In what way other than a single department can we have a smooth functioning command ready in war—a command ready to roll when the alarm rings in, because it existed, studied, trained, and acted as a unit in peacetime?

How, but in a single department, can we get the correlated training for efficient joint operations, eliminate absurd and unnecessarily costly duplications of effort in the purchase, storage, distribution, and issue of supplies and manpower to provide for the needs common to the air, ground and sea forces?

How else can be created and trained a team of co-equal arms as a powerful efficient instrument of protection for our national policy, and with a minimum budget made possible by the elimination of competitive interests?

Opponents of unification have, as a rule, based their objections on such issues as the loss of sentiment, tradition, and *esprit* under unification. They claim that one service might be in a minority, or that the operations might be in the hands of those who do not understand them—that with three services and two

top positions there will always be a time when one will not occupy a top position—that unification would eliminate healthy competition between the services. There are others, but like those cited above, there seems to be a pretty sane and practical solution for each objection. Most of these issues are mere details which can be ironed out for the common interests of our national protection. They serve only to cloud the main issue and its solution.

At the risk of going out on the deep end, The Cavalry Journal submits the following answers to the opponents of unification:

Sentiment, tradition, and *esprit*, under the present plan of unification, would not be lost. They would still be fostered and retained by personnel and units, the same as before. The air force, the army, and the navy would keep their separate identities and staffs.

As far as the minority issue is concerned, the very essence of the plan is that no service can go its own way without consideration of the *total* problem of military security. The Cavalry Journal cannot believe that persons who have reached the important positions as outlined in the plan would "gang up." How could the operations of any one of the three services be in the hands of those who do not understand them when the Chief of Staff of the Armed Forces is a policy and strategy official? Operations are left with the army, the navy, and the air force, or (in case of war) with the supreme commander in the field.

It is true that there are two top positions, but the professional heads of each service always sit in with the Joint Chiefs of Staff. Their views will always be heard.

There is still room for healthy competition between the services under the plan, and it will be *healthy* competition and not needless waste. A control at the top is just what is required to keep it from going from the *healthy* to the waste angle.

According to The Cavalry Journal's research in the matter of unification, the Secretary of War, Generals Marshall, Eisenhower, MacArthur, Arnold, Devers, Spaatz, Kenney, Doolittle and nearly all other officers who have had big war responsibilities are in favor of unification. The Joint Chiefs of Staff Special Committees were for it 3 to 1. The Joint Strategic Survey Committee comprising an admiral, a ground general, and an air general, were unanimously for it. At least 50 per cent of top naval commanders, when interviewed in 1944, were for unification. We have also been informed by reliable sources that the American Legion, the Reserve Officers and National Guard Associations are in favor of it. Seventy-five per cent of the Press, as shown by editorial comment, and 64 per cent of the public as shown by the Gallup Poll, are for unification.

Surely the issues are clear—the arguments have been heard. Further discussion would only seem to delay an important decision for purposes other than of national interest. Yes, the decision should be made promptly, and the plan put into effect immediately thereafter.

American Saddle Club

It is interesting to note the number of horse organizations that are springing up all over the United States. Groups of men, women, and children who share a common interest in the horse and in riding, are joining together for recreation and fun.

One of these organizations is the American Saddle Club. From what started as a simple effort to promote friendship, understanding, and hospitality among people who are fond of horses, has grown a national association of horsemen of every inclination. They now publish a monthly magazine called *The Quirt and Crop*. It is a very good little publication. If you are interested in horses, why don't you drop a line to Ray Fox (the Editor), Box 1227, Rapid City, South Dakota, and ask him to send you a sample copy and also all the dope on the association?

4th Armored Division Association

A group of former 4th Armored Division members are organizing the 4th Armored Division Association.

It is requested that all interested former members of the 4th Armored Division please notify THE CAVALRY JOURNAL of their present mailing address. We will be glad to forward this information to the acting secretary of the association.

No political or commercial aims are contemplated by this organization.

Armored Divisions' Combat Commands*

by Lieutenant Colonel Wayne D. Smart, Cavalry**

The armored division is organized to provide flexibility in the formation of tactical teams. The self-contained battalion is the basic unit.

Units are attached to the two combat command headquarters and to the reserve in accordance with the mission, the terrain, and the enemy situation. Additional separate tank battalions, armored or other infantry, artillery, engineer, tank destroyer, and antiaircraft artillery units, are attached as available and as the situation dictates. (Field Manual 17-100, The Armored Division.)

IN the organization of an armored division there are incorporated two groupings known as combat commands and a third grouping known as the reserve command. These groupings are so organized as to provide a task headquarters for any mission the division commander may designate. Field Manuals say little of these combat commands; yet usage and intent have materially affected the employment and success of all the present armored divisions.

During the early days of armor and amalgamation at Fort Knox, Kentucky, two historical cavalry regiments as well as a famed infantry regiment and artillery unit formed a command under the banner of the 7th Cavalry Brigade. The symbol of this unit was the familiar tank track and cannon on a "field" of cavalry yellow. Shortly after the gathering of these various units, the 1st Armored Division was formed and activated. When this occurred, the 7th Cavalry Brigade minus the infantry became the 1st Armored Brigade and a subordinate headquarters under the 1st Armored Division Headquarters. Its function was to coördinate the operation of the elements of the division during all tactical operations. It performed the function of command but not of administration. Being the only headquarters in the chain of command between division headquarters and the regiment, and operating actively then only during tactical phases, the 1st Armored Brigade soon assumed the characteristics of a "fifth wheel" in the chain of command. Its value was not underestimated nor was it poorly staffed. There existed a definite need for such a command but not merely as an adjunct to division headquarters.

With the activation of the 1st Armored Division the fact that there was only one brigade headquarters caused an unnecessary overlapping of command functions; so, at a critical moment in the fortunes of the Armored Forces, the combat commands were born. The combat command was the brain child of that Grand Old Man of the Armored Forces, General Adna Chaffee, who, sagaciously counselled by his staff of now famed leaders of our armored divisions, fostered the original idea and fondly watched its growth during his last years.

He visualized that the combat command would be a headquarters of a tactical nature to which could be attached any number of battalions or other units that might be required for a particular task. It is believed by older members of the Armored Forces that General Chaffee never intended that any set composition be made for any combat command, that it should be flexible and not permanent nor even semi-permanent. Its characteristic of being purely tactical in organization would have normally prohibited its retaining any degree of permanency.

However, during the past campaigns in Europe, many armored division commanders chose to create combat commands of fixed composition. Looking over reports, one finds the same units in Combat Command A throughout the entire European action, although it is certain that conditions varied from day to day as the battles progressed from St. Lo to the outskirts of Berlin. This tendency to fix the composition of the combat command restricts the inherent flexibility of the idea fostered back in Kentucky by General Adna Chaffee. This method of using the same combination is inclined to build up "the responsibility feeling" for the attached unit over and above that normally intended. It is inclined to take some of the division headquarters' duties and pass them on to the combat command headquarters which, normally, is not staffed to handle such extra problems. When the combat commands organize small task forces within the command, one begins to wonder just what the division headquarters is doing.

In some armored divisions which earlier operated under the old T/O, there was the matter of regimental headquarters to consider along with the combat command headquarters. Combat Command B of one armored division superimposed its headquarters on the regimental headquarters of one of its armored regiments, which was the largest headquarters in the combat command, for the operations in Africa. The double "issue" of staff officers for one position made some confusion initially, but in due time this was worked out. The need for extra liaison officers and replacements usually took care of any extra personnel. In other divisions which had similar organizations the creation of small task forces within the combat command took some of the regimental staff as commanding officers.

*Military Review.

**Instructor, Command and General Staff School.

In the armored divisions, which were activated under a new Tables of Organization, there were many different interpretations of the functions and employment of the combat commands. Generally speaking, most of these new armored divisions utilized their combat commands as formations of standard size and type, assigning to them the same battalions regularly, and supplementing this organization with whatever other units not organic to the division there were available and suited for the particular mission. This idea violates the principle of flexibility set forth by General Chaffee; but the rebuttal points out that understanding and coördination are obtained between units which have worked together, that training, liaison, and coöperation reach their highest peak when elements continue their relationship day after day. One armored division in particular has followed the basic idea of General Chaffee in that no regular assignments were consistently made to each combat command. Each mission dictated the assignments of units to the combat command: that two up to six battalions may be attached to one combat command depending on the situation.

Some armored divisions made an equal split between the combat commands, giving to each CC an equal number of tank units, infantry units, and artillery. This "balanced" formation was particularly effective against a demoralized and defeated enemy. It is a formation which facilitates the exploitation of a hostile country. It can be further broken down into "task forces" within the combat command, as was frequently done by our armored divisions in Germany, in order to make rapid advances in multiple columns, to harass a worried enemy, and to disrupt any attempt to reorganize by a fallen foe. The principal disadvantage of this type of organization was found to be a dissipation of strength over the battle area. Plenty of harassing action was accomplished; but when the enemy defended in any sizable force, the small task forces were made to bypass these enemy strongpoints. The composition of a combat command using the "balanced" formation normally would be one tank battalion, one infantry battalion, and one artillery battalion. To this group were added some engineer, reconnaissance, medical, and maintenance elements. Any other troops, not organic to the armored division, would likewise be evenly divided among the combat commands. For a fluid situation such as we had in the closing days of the European war, this "balanced" formation worked fine.

Some armored divisions are reported to have favored the "unbalanced" type of combat command; that is, the armored division was organized into combat commands according to the type of weapon and equipment of the battalions. Consequently, one combat command would have attached most of the infantry battalions, and the other combat command would be composed mostly of tanks. Of course, these same combat commands would have other troops such as the engineers, reconnaissance, attached antiaircraft, tank destroyer, and supply support within the organization to make up the complete combat command; but their main force would consist of either tanks or infantry. Sometimes the abruptness of the division would be tempered by attaching a company of infantry to the tankers, and vice versa with the tanks to the infantry combat command. This combat command possessed great shock power in massing the tanks in one organization, and a good base of fire in the collected infantry battalions in the other combat command. When the artillery battalions were added, attaching one to the striking force and the remaining organic two to the base of fire, it made this formation one of the most powerful attainable. The arrangement had a few disadvantages. Theoretically, the base of fire would be in position to support the maneuvering force, the tanks; but reports from the European theater state that frequently the infantrymen of the base of fire would become involved in a local battle while the tanks were engaged in another some distance away. Both commands would ask for the other's support but would not be answered. Sherman was certainly right!

It has been discovered in such unbalanced combinations, the infantry attached to the tank combat command was not enough in number to support adequately the tanks and sustain the high casualty rate. The practice of fighting dismounted, caused by enemy actions, expended many infantrymen who were not protected by even the thin plate of a half-track vehicle. These men would endeavor to consolidate a position taken by the tanks, but with their few numbers they would be unable to withstand the strong German counterattack. The tanks in some cases would lend assistance; but normally in the German situation, they would continue attacking the enemy until they had outrun their infantry support. Frequently the strength of the attached infantry would be further dissipated by having to guard prisoners of war. Even the prisoners captured originally by the tanks would have to be turned over to the infantry in order to release the tanks for further gathering of prisoners, etc., etc. There is no question, but what this is one good use for armored infantry with tanks, but the point is that there are not always sufficient soldiers to "go around."

This is one of the points almost all armored division commanders agree on; that is, that the armored infantry should be doubled (and even some commanders think tripled) in a new organization of the armored division.

Another combination favored by one armored division was to retain division control of all artillery battalions. This policy was habitual unless the combat command was on a detached mission, in which case the necessary artillery would be assigned to it. The artillery so consolidated and controlled did not constitute a combat command. This arrangement meant that while no combat command had any artillery directly under its control, it was able to call for direct support from the combined artillery battalions and receive the maximum fire of the division, if the target warranted it.

The employment of a third combat command varies in different armored divisions. It is believed that this

combat command was first thought of as a reserve set up to act as a pool for all combat elements not assigned to combat commands. It was not used as a tactical headquarters except on a few rare occasions where the objective was very limited or the mission was a defensive one. The Tables of Organization do not allow many men for this headquarters, three officers and five enlisted men; so whenever this headquarters was considered for any contemplated action other than acting as a headquarters for the non-assigned combat elements, it would have to obtain additional staff officers from division headquarters to handle the situation adequately. Again, it has been pointed out, by one of our successful and famed armored commanders, that this thought was the original conception for this command by General Chaffee. He did not intend it to be a third combat command, although in some armored divisions it has attained a place "in the sun" equal to the other combat commands.

How about the organization of the armored division with its combat commands in the Pacific theater? We realize that there were actually only a few places where an entire armored division could operate. If the terrain did not restrict the employment of this organization, then the facilities to support such a unit were lacking or were considered beyond the value of the unit in the theater. Therefore separate tank battalions were used in this zone in conjunction with the infantry. These separate tank battalions might well have been consolidated under a combat command, but then the first thing that would have happened would have been the counterpart of an armored division. No, the mission of tanks in this area was to support directly the advancing infantry. The tanks of a battalion might well have been divided among the combat teams of the infantry divisions and have found that their chief rôle was supporting the doughboy. It is questionable if tanks would ever have operated alone. Rather, it was felt that tanks employed here must be more of an adjunct to the infantry elements and must lose their identity as separate tankers.

In this discussion of combat commands, there enters that radical but paradoxically same question, *Why combat commands?* Why should not the armored division be so organized, with regiments similar to the infantry divisions? These regimental headquarters with their more permanent staffs would supplant the combat command headquarters with its limited staff. Each regimental headquarters would have tactical and administrative control of all elements of the regiment plus any attachments. The regimental headquarters would take over all the functions now performed by both regimental and combat command headquarters.

Each regiment, of which there might be three in the Tables of Organization for an armored division, should have three battalions. Remembering the dire need for additional infantry, it has been proposed that these battalions be made up of three companies each, one of these companies to be a medium tank company and the other two, infantry companies, armored. Or, it has been suggested that one of the battalions be a tank battalion and the other two be armored infantry battalions. The important point is, in either combination, to have twice as many infantry as tank battalions. The regiment, in addition to the three battalions mentioned, should have the supporting elements such as reconnaissance troop, headquarters company, service company, and engineer company to make it a self-sustaining fighting unit.

This organization would present a working combination which has trained together and understands the mechanics of combined operations as they apply on the battlefield. The regimental staff is always employed in normal functions, both administrative and tactical. The size would be unwieldy but would present a formidable front to almost any opposition.

If the system of separate battalions is retained, then the organization of a combat command headquarters becomes essential. It is felt, however, that if this is the case it is necesary to build up the staff to such proper proportions that they are, in effect, a regimental type of headquarters. This would be inclined to make a combat command a permanent fixture, but flexibility may be maintained by rotating the attachments so that all the division elements become accustomed to each other.

From the discussion already presented, it can readily be seen that the subject of "combat command" is controversial and that a great number of differences exist among the various armored division commanders regarding the composition of the combat commands and their employment. Furthermore, there does not seem to be an accurate solution to the question in that all of the armored divisions have had outstanding successes in their campaigns and encounters against the enemy in Africa, Sicily, Italy, France, and Germany. This fact may prove the point that the type of organization is not the deciding factor in any battlefield success, but rather it is the amount of training and understanding that exists with all personnel, commanders, officers, and "GI's."

In conclusion, can it be said that any formation has the call over another? The "balanced" formation, that is, having at least two of the combat commands similar in organization, has obtained and won many followers because of its application and outstanding success in Europe. The "unbalanced" formation, that of having a striking force composed of the more maneuverable vehicles such as the tanks in one combat command and the base of fire element composed of the artillery and infantry in the other combat command, is theoretically sound and would be used properly against stiff opposition where the flanks cannot be turned in order to effect a breakthrough and exploitation. In both combinations we discover that the combat commands make up task forces; so we end up with the armored division spread out over the enemy like a giant who has tenacious tentacles . . . and after all, that's the idea, isn't it?

21st British Army Group in Europe, 1944-45*

Conclusion

The following article is the conclusion of a lecture given by Field Marshal Sir Bernard L. Montgomery before the Royal United Service Institution, the first part of which appeared in the January-February edition of* The Cavalry Journal. *The first installment told the viewpoint of a commanding general during a major campaign. This final installment tells of additional problems that were met, the special weapons that were used, and appraises the new tactics that were employed.

Grouping

To be successful in battle the fighting machine must be so set in motion that it can develop its maximum power rapidly, and the troops must then be launched into battle properly; in fact, what I call "Stage Management of the Battle" must be first-class. The plan of battle must be made by the commander, and in it he must give careful thought to the correct grouping of his formations, his armor, his artillery and other resources. Throughout the battle area the whole force must be so well balanced and poised that there will never be need to react to enemy thrusts; these can then be disregarded and the battle forced relentlessly to swing your way. This requires that the commander should always be thinking far ahead, although of course his final decisions of grouping must await full development of the problem. Skill in grouping, and in quick regrouping to meet the changing situation, is a very great art, and it requires much study before proficiency is obtained.

Consider the Battle of Normandy. I have shown how it was developed and accomplished according to the plan made well before D Day,* and you will notice that the grouping of our resources was such that the enemy was unable at any time to cause us to deviate from our purpose. We held the initiative throughout, and we arrived where we meant to be on time—in fact about a fortnight early. I have already given other examples, particularly in connection with the Battle of the Rhineland and the Battle of the Rhine.

It is worthy of note that in this campaign grouping, and the preserving of correct balance, were more vital than ever. In the northern sectors the magnitude of our commitments compared with available resources made it impossible to provide the text book scale of reserve formations, or indeed anything approaching it.

Administration

In the early stages of the campaign much depended on the successful issue of the administrative planning. The task was a formidable one, and in plain terms meant the export overseas of a community the size of the population of Birmingham. Over 287,000 men and 37,000 vehicles were pre-loaded into ships and landing craft prior to the assault, and in the first thirty days 1,100,000 British and American troops were put ashore.

There was the necessity to foresee and provide all that is required for a major static battle quickly followed by a rapid advance of some 400 miles, which entailed the landing of some 200,000 vehicles and 750,000 tons of stores during the corresponding period. And I can say that even in these exceptional conditions planned operations were never held up even for a single day by any lack of administrative resources.

In the early stages the vast quantities of stores required were landed over open beaches, a task which was greatly assisted by the Mulberry. The stores were directed into a number of field depots, whence they were dispatched to the troops. As soon as conditions permitted, these field depots were concentrated into a single organization called the Rear Maintenance Area.

When the break-out from Normandy occurred, considerable problems arose because the lines of communication became stretched in a short time from Bayeux to Antwerp—that is some 400 miles. All bridges over the Seine were demolished, and the railway facilities extensively damaged. In order to maintain the advance, shipping and the discharge of material were cut well below the figure necessary for the daily maintenance of the force, so as to release every lorry possible for ferrying

*The Journal, Royal United Service Institution.

*See The Cavalry Journal, January-February, 1946.

stores forward to the troops. We were thus eating into the reserves built up in the Rear Maintenance Area, and it became a matter of urgency to get bases farther forward and shorten the lines of communication. We had both feet off the ground, relying on opening up the Channel ports, particularly Dieppe, before our accumulated stocks became exhausted. But you have to take administrative risks in war as well as tactical ones; the point to realize is that a commander requires a nice judgment to know when risks are justifiable and when they are definitely not so.

Gradually the railway systems were re-established, and when eventually the port of Antwerp was opened to shipping, we were able to base ourselves firmly on depots established between there and Brussels. We continued to handle subsidiary tonnages through the Channel ports.

I would mention one very important feature of administration which has been confirmed during the campaign. It is that there is a reasonably constant figure covering the combined ammunition and petrol tonnages required, though of course the split between these commodities depends on the type of battle you are fighting.

It is not possible in such a short survey to go into any detail concerning the vast and complicated machinery necessary for the support of a modern army in the field. I will, however, mention the tremendous importance of Movements and Transportation. Their problems in this campaign were immense. There were the numerous technical and engineer problems of repairing and operating the damaged or demolished ports, railways and inland water transport systems of 4 European countries. Bridges had to be built over such obstacles as the Seine and the Rhine. Possibly even more important was the problem of coördinating and allocating traffic over the various means of carriage, and of setting up organizations for operating through services over the different national systems.

The "A" services, too, were confronted with special problems. The calculation of reinforcements required, together with a correct balance for every arm and trade, called for considerable foresight and experience, and had a very direct effect on the success of operations. I will also mention Welfare, which has reached a standard in the army probably never previously approached.

Very great praise is due to the various services and departments which so successfully overcame their problems and difficulties and carried out their functions in such an efficient manner.

Specialized Equipment

Early in the planning for D Day it became evident that specialized armored equipment would be necessary to overcome the beach defenses. One of the recommendations made as a result of the Dieppe raid had, in fact, been that engineers should be carried behind armor up to the concrete obstacle which had to be breached. This idea was developed so that mechanical means could be used for placing or projecting charges from tanks without exposing the crews. Tank-carried bridges for crossing antitank ditches were developed as well, and were launched mechanically from behind armor. (See *"Bridge Laying By Armor,"* The Cavalry Journal, September-October, 1945.)

The study of the particular problems presented by the Normandy beach defences led to the preparation of further specialized equipment. Mats laid from tanks were used to cross soft patches of clay on the beaches; a turretless tank was used as a means of providing a self-propelled ramp over which other vehicles could scale sea walls; flail tanks for mine clearing and amphibious tanks to lead the assault were ready by D Day, and were integrated with the engineer tanks into well trained assault teams.

Specialized armor made an important contribution to the success of the landings. The beach defences were quickly overcome and the new technique of landing a great weight of armor early in the assault paid an excellent dividend.

As the campaign progressed, the need for special armored devices became increasingly apparent. Against fixed defenses such as existed around the ports, mine-sweeping tanks, flame throwers and engineer tanks were invaluable. The Churchill flame thrower was outstandingly successful throughout the campaign. It has a very great moral effect on the enemy and saved us many casualties.

The D Day technique for the early landing and quick build up of armor was also applied at the crossings of the Rhine and the Elbe. This was made possible by the use of amphibious tanks and amphibious assault craft carrying infantry, light vehicles and supporting weapons. It was largely the use of these craft which allowed operations to be continued throughout the Winter over the flooded areas between the Maas and the Rhine.

Armored personnel carriers were also found to be necessary, and were improvised from tanks with the turret removed. Their use gave armored mobility to infantry and enabled them more closely to accompany armor in the assault and pursuit. The vehicles, known as "Kangaroos," I shall mention again later.

All these various equipments were concentrated, for training and administration, in a special formation, the 79th Armored Division. They were sub-allotted in support of formations and units as operations required. The divisional commander was responsible for providing competent advisers in the use of the equipment at all levels. It was found that centralization under him was essential in order to achieve flexibility and provide a controlled program of workshops overhaul, rest and relief.

The Royal Armored Corps

The Royal Armored Corps lived up to its highest traditions in this campaign. It was really properly equipped with adequate scales of reserves, and the fighting gave full scope to its flexibility and adaptability.

The outstanding point which emerges once more is that we require only two basic types of tank—the capital tank (for fighting) and the light tank (for reconnaissance). The capital tank must be a weapon of universal application, suitable not only for working with the infantry in the attack and in the dog-fight battle, but also capable of operating in the spearheads of the armored division in pursuit. I am convinced, as a result of experience from Alamein to the Baltic, that it is fundamentally unsound to aim at producing one type of tank for coöperation with the infantry and another for the armored division. We require *one* tank which will do both jobs. I have learned that the ubiquitous use of armor is a great battle-winning factor.

Artillery

The gunners have risen to great heights in this war and I doubt if the artillery has ever been so efficient as it is today.

In considering the future of the artillery, it is very important that we should get the organization right, with the correct balance between tracked guns and towed guns, and so on. The expenditure of ammunition in this campaign has been tremendous, and as a result of the experience we have gained, certain facts have emerged. It has been found that a large *number* of small shells over a given time produces a greater effect on the enemy than the same *weight* of larger shells. It is, moreover, important to remember that there is a time limit for bombardment, after which enemy morale gets no lower and further expenditure of ammunition is wasted. We have found that our own casualties rise in direct proportion to the distance of the infantry behind the artillery supporting fire.

All these facts point to the need for relatively small shells for close support of infantry, where neutralization and not destruction is the immediate object. The 25-pounder meets the case; it must have good fragmentation. I would mention the fuze problem as this requires study and development. We must have a good proximity fuze and a good time fuze.

Lastly, the Air Observation Post. The Air O.P. has proved its value in this campaign. It has become a necessary part of gunnery and we must press for a good aeroplane for the job. Very good R.A. officers are required for duty in the squadrons, and they must be selected with this in view. Primarily an Air O.P. officer must be a good gunner—it is not difficult to teach him to fly.

The Engineers

The engineer problems were unusually formidable, and had to be executed at a great speed.

In the early days the clearance of beach obstacles and mines gave rise to great anxiety and called for prolonged and detailed study. The problem of placing the Mulberries or artificial ports was solved by the excellent coöperation between the Royal Navy and the engineers on both sides of the Channel. As the beachhead began to expand, we were faced with demolitions on a grand scale—demolition of ports, railways, bridges and airfields—combined with extensive and very skilful mine laying.

The repair of well-blitzed and intentionally demolished airfields, or more often construction of new ones, was in itself a major task upon which depended our support from the air.

Twin petrol pipelines were laid from Cherbourg across the Seine at Rouen, and from Boulogne stretching across the Rhine. These were supplied from ships pumping ashore, and later in particular from the famous "Pluto." (See *"Operation Pluto,"* The Cavalry Journal, July-August, 1945.) The pipelines transported during the campaign more than a million tons of petrol.

We erected nearly 2,000 Bailey bridges, including spans across the Seine, the Meuse, the Rhine and the Weser, some of which were nearly a mile long. It has once more been shown that rivers, even very big rivers with complete demolition belts, do not hold up an army, in spite of the weight of modern traffic.

Armor and the mass of lorries assisting the Army played havoc with the roads, and the maintenance of them in conditions of continual traffic, especially in low-lying districts in severe Winter conditions, was perhaps the most heart-rending task that faced the engineers. They were greatly assisted by the Pioneer Corps, which in this task, as in so many others, did a very excellent job.

The most determined demolitions were in the ports. But we have proved that it is impossible to destroy a port so badly that it cannot be put into some sort of operation by the time the navy has cleared the mines obstructing its entrance.

The sappers were very well equipped, but it is important to remember that it is the human element—the resourceful officers and skilled and willing men—which is the major factor in engineering in war. We were often very short of sappers, particularly during the big river-crossing operations.

Signals

It is fundamental that successful operations demand really efficient communications. It is therefore worth emphasizing that a commander, at whatever level, must take his Royal Signals adviser into his confidence from the earliest stages in preparing a plan.

Much of Signals' work was of the unspectacular, slogging variety which the provision of a vast network of communications involves. The constant aim of Signals was to build up the solid cable head as far forward as possible, to provide reliable jumping-off places for communications in the battle area. To serve my own tactical headquarters, which frequently moved at intervals of every two or three days, use was made of

an ultra high-frequency wireless of an entirely new type (No. 10 set). This method gave me secure speech communication with my armies and my main headquarters.

I think that one of the main Signals lessons has been the necessity for insisting that the officers reach a really high standard of technical ability. Modern equipment becomes increasingly complicated and diverse, and the officers must know all about it if they are to get the best results.

The Infantry

In spite of predictions to the contrary, the infantry has lost none of its importance on the battlefield. Modern infantry is a master of more weapons than ever before, and the infantryman's life depends primarily on the skill with which he uses them; he must reach an increasingly higher standard of training. It has been a war of movement; but although the infantryman may motor into battle, his training must keep him hard and tough—a point which must never be overlooked in these days of troop-carrying transport.

The introduction of the armored personnel carrier is an important innovation in the employment of infantry. It enables infantry to be transported across bullet-swept zones in order to arrive fresh at the vital part of the battlefield. The development of this technique has already gone far and done much to enlarge the scope of infantry tactics. For example, in the first major attack by the Canadian Army astride the Falaise road on August 7th, infantry carried in "Kangaroos" were moved by night a distance of five miles to their off-loading point; the last three miles of this advance were actually within the enemy positions, and the troops debussed almost on the edge of the enemy gun areas. They then fanned out to overrun the belt of country they were attacking.

The tendency to do more and more by night has been greatly facilitated by the provision of "artificial moonlight." Artificial moonlight, provided by searchlight batteries, has now become a standard part of our military organization and has greatly assisted the activities of the infantryman. It has also proved its value in the more rearward areas to the bridge builders and administrative echelons. (*See story in this issue.*)

It has again been the infantry who suffered the heaviest casualties. I cannot praise too highly the stamina and persistence which the Infantry displayed in the campaign. Divisions were called upon to remain continuously in action for many months on end. To this they responded admirably, even during the very bitter Winter we experienced.

Airborne Forces

Airborne forces must now form an essential part of the army, as there will often be occasions in which they can play a vital rôle. Apart from their participation in the battle, the threat of their use can be turned to important advantage, for experience has shown that thereby the enemy can be led to make considerable and even vital dispersions of his front line forces. This is in addition to the need to lock up troops in rear areas for guarding vital zones and installations when the opponent is known to have airborne troops at his disposal.

The use of airborne forces in highly mobile operations is limited, because the time required for planning their descents frequently results in the ground troops overrunning the projected dropping zones. But in deliberate operations, such as the seaborne assault or the assault across a major river obstacle, airborne troops have proved to be a battle-winning factor.

The threat of an airborne operation, in conjunction with other factors, was material in causing the Germans to retain major formations in the Pas de Calais during the initial period after our landing in Normandy. Nearer the battlefield, uncertainty as to our intentions, combined with the use of dummy paratroops, caused alarm and despondency to the enemy. This delayed the arrival on the battlefield of portions of his forces at a vital time.

There are a number of limitations in the use of airborne troops, chief of which is the uncertainty of weather. But I believe this factor will become less important in the future as scientific methods are developed to facilitate the use of aircraft under adverse weather conditions.

I think we must re-examine our present organization of the airborne division. I should like to see the paratroops and the glider-borne elements combined together in a standard type of brigade since, once it reaches the ground, the airborne brigade fights as infantry.

The Medical Organization

No account of this campaign would be complete without some mention of the truly remarkable success of the medical organization. But it must be remembered that there were two factors which contributed greatly to the results achieved; probably no group of doctors has ever worked on better material and, secondly, they were caring for the men of a winning army. The men of the 21st Army Group were fully immunized and fully trained; their morale was at its highest; they were well clothed and well fed; they were fighting in a climate to which the average British soldier is accustomed; hygiene, both personal and unit, was exceptionally good; welfare services were well organized. The exhilarating effect of success also played its part in reducing the rates of sickness.

Commanders in the field must realize that the medical state of an army is not dependent on the doctors alone. Their efforts are immeasurably facilitated when morale is at its highest, and of all the factors which insure a high state of morale, there is none more important than success.

The sickness amongst troops was almost halved as compared with the last war. It is striking that, as we swept through Germany liberating prison camps such as Belsen and Sandbostel where thousands of persons were dying of typhus, only 25 British troops contracted this disease. None died of it. This was due to preventive inoculations and to the adequate supply and use of a powder called D.D.T.

Air transport has been of great importance in the evacuation of casualties. By this means over 100,000 wounded men were evacuated to base hospitals from front line units. In the sphere of transfusion, great quantities of blood and blood plasma were used. A coordinated service of air transport and refrigerator trucks insured that fresh blood was always at hand for surgeons working directly behind the lines, even during the rapid advance into Belgium.

Another interesting fact is that in the last war two out of every three men wounded in the belly died. Field Surgical Units, operating close behind the lines, greatly reduced this danger. In the Normandy campaign two out of every three men wounded in the belly recovered.

The healing of war wounds has been revolutionized by the use of penicillin. Many men, who in the last war would have been permanent invalids, were fit and ready to go back to the line within a month of being wounded.

To sum up, the doctors were prepared to lay 15 to 1 that once a man got into their hands, whatever his injury, they would save his life and restore him to health. It is a fine thing that these odds were achieved with a handsome margin.

Conclusion

I must emphasize that my narrative has been concerned with the 21st Army Group, but it is well to remember that any complete story of the campaign in north-west Europe would tell you more of the tremendous effort of the United States and of the fighting on the more southerly sectors remote from the 21st Army Group zone.

I would also say that the scope here has permitted only the briefest reference to our great Russian ally, but we must remember that the Russians bore throughout the greatest weight of the enemy onslaught on land.

Events have amply shown what a splendid spirit of coöperation was achieved in this war between the navy, army and air force; I doubt if such a smooth and efficient system of working together has ever been achieved before. This applies equally to the relationships between the three British Services and their American counterparts.

It has been brought home to me, not only in this campaign but throughout the war, that the soldier on the battle front and the worker on the home front are closely linked members of the same team—neither can achieve any success without the other; both have to stand firm under fire and both have to see that their job is carried on in spite of all the enemy can do.

In this war the civilian on the home front has shown the true British spirit of determination to carry on, in spite of every difficulty and every danger that the enemy could cause. If he had not done so, the soldier on the battle front would have fought at a very great disadvantage.

In conclusion, I wish to pay tribute to the splendid fighting spirit, heroism and endurance of the ordinary soldier of the British Commonwealth of Nations. Once again he has indeed proved himself second to none. And if I were asked what is the greatest single factor which contributed to his success, I would say morale. I call morale the greatest single factor in war. A high morale is based on discipline, self-respect and confidence of the soldier in his commanders, in his weapons, and in himself. Without high morale, no success can be achieved—however good may be the strategic or tactical plan, or anything else. High morale is a pearl of very great price. And the surest way to obtain it is by success in battle.

Excerpts from Secretary Byrne's Speech, February 28, 1946

"While it is not in accord with our traditions to maintain a large professional standing army we must be able and ready to provide armed contingents that may be required on short notice. We must also have a trained citizenry able and ready to supplement those armed contingents without unnecessarily prolonged training.

"That is why in the interest of peace we cannot allow our military establishment to be reduced below the point commensurate with our responsibilities, and that is why we must have some form of universal military training."

The "Snake"

*by Major Thomas W. Wood**

THE minefield-clearing "Snake" has been a paradox in its effectiveness and lack of use. Originating in Bangalore, India, where bamboo stalks were first filled with explosives and pushed by hand through enemy defenses to clear a safe path, the Snake is a large bangalore torpedo which is pushed by a tank.

The Snake is a long and narrow semi-rigid metal shell filled with explosives, and can be assembled in lengths up to 400 feet. It is put together in an area removed from enemy fire, towed by the tank to the edge of the minefield, then pushed by the tank into the field and detonated. The blast pressure set up by the terrific explosion of 4,500 pounds of amatol destroys all mines down its length and far enough to the sides to provide a mine-free lane through which tanks or other forces can advance. This is the only known method of quickly obtaining a completely cleared lane through a minefield without exposing personnel to small-arms fire.

In the Anzio break-through of May 23, 1944, the Allied columns of tanks, tank destroyers, and infantry advanced through two lanes blasted by Snakes across dense and deep minefields, and quickly gained their objective against a surprised enemy. Near by, in another combat command, where Snakes also had been prepared but at the last minute were not used, 30 tanks were lost when the unit made a similar advance. This attack was over ground which prohibited the use of mine detectors because it was littered with shrapnel from four months of heavy fighting.

The Engineer, AFHQ, wrote of this: "Judging from the success of the operation described, it is believed that the Snake will prove to be a very worthwhile weapon." This echoed the belief of those who had followed its development in this country and had seen it employed in demonstrations. Yet the Snake was never again used in combat after Anzio. Some of the reasons why may be found in a description of what the Snake is and how it works, as well as a further examination of the combat reports from Anzio. These may likewise show that there is now ample justification for the belief that the Snake may be "a very worthwhile weapon."

*Corps of Engineers.

The Snake, only quick method of clearing a lane through a minefield, is shown being pushed into position by a tank.

The British recognized the need for an effective mine-clearing weapon in the early days of the war in Africa and suggested, as an answer, large bangalore torpedoes which were made by filling lengths of pipe with explosives. It was known that enough explosives in the right place would accomplish the job. The problem was to find an effective means of placing the line charge across the minefield. Actual development of a device to accomplish this was a continual compromise between providing enough explosives to detonate known enemy mines, and the many factors that came into manufacture and tactical employment, such as weight and bulk, field assembly time, special training required for personnel, hazards to friendly troops, tank attachments required, availability of critical materials, and a host of other items.

The M3 aluminum Snake, as finally developed, consists of two parallel linear explosive charges encased between corrugated metal plates, bolted together to form an assembly which can be towed or pushed by a light or medium tank. It is flexible in vertical plane to permit it to pass over rough ground, and rigid enough in horizontal plane so it will maintain a relatively true course when being pushed. The assembled M3 Snake is 14 inches wide, five inches high, and 400 feet long. It weighs approximately 9,000 pounds, including 4,500 pounds of explosives.

The explosives are contained in elliptical aluminum-cased cartridges, 5 feet long, approximately 5½ inches wide by 3¾ inches high. Each cartridge weighs 40 pounds and contains 35 pounds of amatol, an insensitive high explosive. One end contains a cap-well to receive a standard blasting cap, which is for use when and if the cartridges are diverted from their normal use in the Snake and are employed for general demolition work.

The Snake is exploded by machine-gun fire from the pushing tank against one of two impact-type fuzes. Two such fuzes are provided in case one is damaged in use or defiladed from the tank gunner when the Snake is in the firing position.

A pear-shaped nose, which allows slight movement in all directions, is connected to the front of the Snake. This keeps the end from digging into the ground, and helps guide it around trees, over ditches, etc.

Assembly of the Snake is accomplished ordinarily by a specially trained crew consisting of one platoon. In daylight, assembly time is approximately one hour after all materials are on the site; at night, under adverse conditions, the time is double. The training of a tank crew to handle the Snake requires about a week.

A properly constructed Snake can be towed for miles over good terrain without showing signs of serious weakening. It can be pushed a distance of about 400 feet in the direction in which it is headed, and must be fairly straight before the pushing is commenced.

It is advisable for friendly infantry within 250 to 800 yards to the sides or 250 to 300 yards to the rear of the Snake to take cover to avoid flying fragments when it is detonated. There is little danger to a man close to the ground, or behind any sort of cover even if he is much closer than the given distance. A man in a foxhole probably would suffer no great harm at 25 yards.

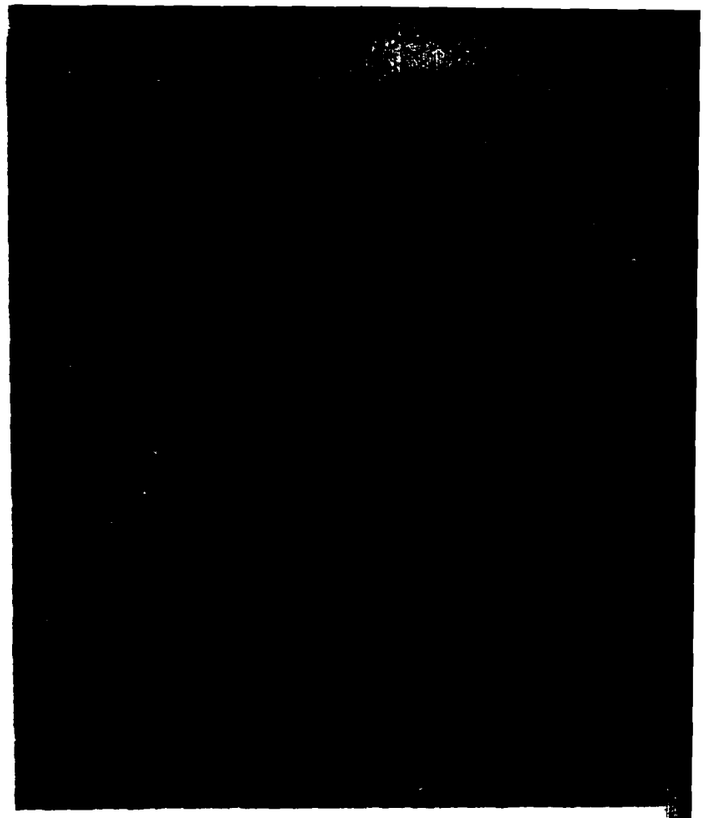
Detonation leaves a well defined crater which plainly marks the cleared lane through the minefield for the passage of tanks or assault forces.

The Snake contains 50 per cent more explosive than the famous "Block Buster" bomb, and therein lies one reason why it was used but once. To the infantryman, the tanker, and all others who do not ordinarily handle explosives, 100 pounds is a tremendous quantity. Speak in terms of 4,500 pounds, and the average listener will express disbelief that you can live within a mile of it. So it is not surprising to read in the report of the Engineer, Fifth Army—"It was noted during the (Anzio) operation that our own infantry and tank men were very much afraid of Snakes. This fear was one of the main reasons the (other) combat command did not use them. Previous to any similar operation in the future, infantry and other troops should be given special Snake training and orientation." In the operation, friendly infantry who were about 100 yards from the scene asserted that they had been "knocked over."

The present M3 Snake has been greatly improved over the steel M2 employed at Anzio. Both encasing plates and cartridge shells are made of aluminum. Now 50 per cent of the total weight is in explosives, whereas with the M2 Snake, only 25 per cent was in explosives. It is easier to assemble and it is safer to use because fragments have been greatly reduced by the use of aluminum, much of which is actually consumed by the explosion.

The improvements made are important. In a discussion of the M3 Snake with a member of the Sixth Army staff shortly before the end of the war, he stated that they intended to carry this Snake on the planned operation into Japan.

From the logistics standpoint, it is to be noted that



Designed to weave its way around or over obstacles, a Snake is shown being pushed through jungle terrain.

if no use is found for the Snake in clearing a minefield, its aluminum-cased cartridges can be used as explosives. They are highly efficient packages of explosives either for assault or general demolition. Newsreels of combat scenes in Aachen, Germany, showed a streetcar being loaded with explosives behind the U. S. lines and turned loose to roll down hill into the well-emplaced Germans. Those explosives were Snake cartridges.

The impact fuze that comes with the Snake is not the only way it can be detonated. At Anzio, the troops had rigged up an improvised firing device consisting of an M1 antitank mine with a steel plate welded to the spider and strapped to the top of the Snake in lieu of the usual, similar, firing device. In the excitement, when the first burst or two of machine-gun fire failed to register on the detonating device of one Snake, the gunner fired a point-blank HE round from the tank's 75mm gun. This registered squarely on the Snake, and did the trick nicely. Perhaps the thought that an enemy gunner might also register on the Snake has been a major deterrent to enthusiastic acceptance by tankers.

As a matter of fact, 60 feet of the tail end of the Snake is loaded with sand bags and not explosives. Almost a direct hit would be required. Tests have shown that high explosive 105mm projectiles must land

within one yard of the Snake to detonate it. If a Snake should be hit or detonated accidentally for any other reason while being pushed into final position by the tank, nothing more would happen to tank or crew than if the Snake were fired as intended. Should the Snake detonate while being towed, however, the tank engine might be temporarily stalled and the result would be more telling.

The forward 20 feet of the Snake is also dummy loaded. Thus, if a mine should be set off by the nose as the Snake was being pushed into position, the Snake itself would not be detonated.

To quote again from the Anzio report: "The two engineer guides . . . began leading the tank-towed Snakes from the assembly area to two gaps in the friendly minefields guarding front line positions. . . . Two Snakes had been placed in line in each gap, the leading Snakes stretching to points about 285 yards into No Man's land, the tails of the rear Snakes approximately even with the beginning of the gap. . . . The towing tanks then backed out over the Snakes and retired." To back a tank over a Snake is dangerous. The tactical situation, where the Snakes had first to be towed through gaps in friendly minefields, may have left no other alternative than to back out over them. The Snake, however, might have been set off at that time by an enemy hit or an accidental strike on the firing devices, or by the tank's getting off center and crushing the explosives hard between the metal plates. An explosion under the belly of the tank would have wrecked the vehicle and killed the crew. After towing a Snake into the position from which it will later be pushed, if at all possible the tank should give the Snake a wide berth. The recommended technique of employment calls for two tanks. Until immediately before H hour, the Snake and the two handling tanks remain under cover behind the lines. At H hour, the towing tank moves the Snake to the edge of the minefield. This can be done at a speed of about four miles per hour. This tank then cuts loose and immediately turns off to the flank. The other tank, which has followed closely behind, then engages the pushing hook and, in an operation which requires about three minutes, pushes the Snake into firing position. The pushing tank backs off a few feet and fires the Snake. The ensuing smoke and dust provide excellent screening for an immediate push through the gap.

In summary, the principal facts concerning the Snake and its employment are:

The Snake is best suited for breaching minefields in a situation that has remained static for some time, although if the supplies are on the site, it can be assembled and employed on several hours notice.

The limits of the minefield to be breached must be known, and the near edge must be plainly marked.

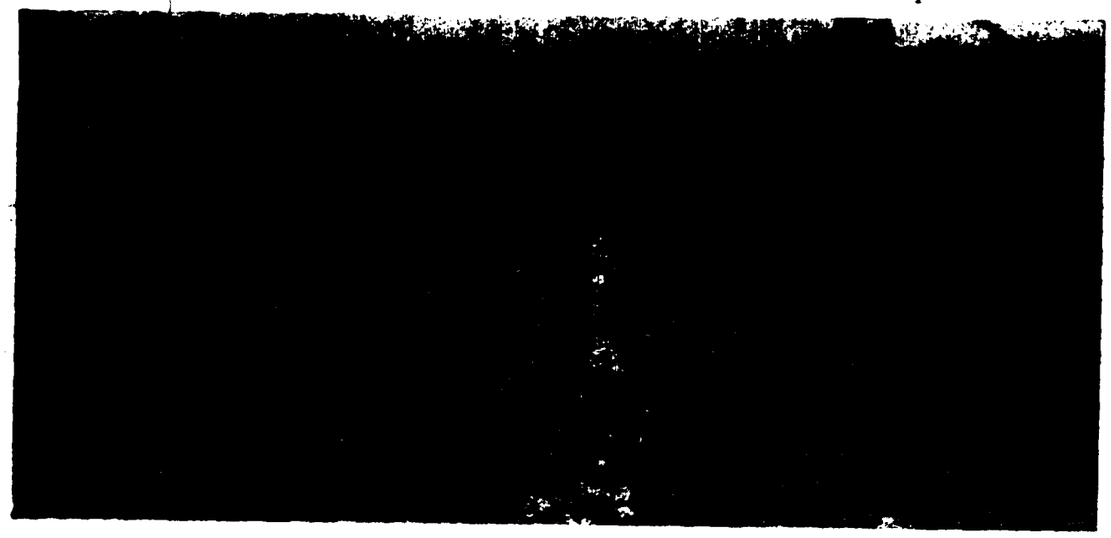
The approach from the Snake assembly area to the minefield must be suitable for bringing up Snakes.

Because of the slow speed at which the tanks handling it move, employment under cover of darkness or smoke is advisable.

Adequate Snake training and orientation must be given tankers and accompanying infantry. There is no undue hazard when employed by well-trained troops.

The aluminum Snake (M3) is light enough to warrant carrying it on an operation with the view of using the cartridges as ordinary explosives if the situation, as it actually develops, should not require the Snake as such.

Upon detonation, the Snake clears a marked path—even in jungle growth—over which troops can advance.



The Comet— Heavy Cruiser Tank

*by Major J. R. W. Murland**

After the British Cromwell tank came its successor, The Comet, more heavily armed and with thicker armor, but with no less speed. Its main armament is the new 77mm, which is carried in addition to two 7.92mm Besa machine guns. Speed is 32 miles an hour.

British Official Photo

Special devices for sighting and laying its guns are an outstanding feature of the Comet, new British tank, one of which is shown approaching the Weser bridgehead.

SOME time before Britain's Cromwell tank made its first and extremely successful appearance in action, the design of its successor, the Comet, was already well advanced. Battle reports on the Comet, first employed in March, 1945, showed that the new tank not only represented a great advance over its predecessor as a weapon of war, but had also demonstrated a similar degree of mechanical reliability—one which would have been considered fantastic a few years ago.

When the question of a successor to the Cromwell was first contemplated, the designers faced the inevitable conflict of military requirements. It was clear that the paramount needs were for a heavier armament together with thicker armor; at the same time it was considered that little, if any, of the Cromwell's great speed could be sacrificed. That this was achieved without the sacrifice of any military essential can only be regarded as something of a miracle.

Beats The German "Tiger"

The gun selected for the main armament of the Comet was the new 77mm, which combines a good armor-piercing quality with the ability to fire a most effective high-explosive shell. It is of interest that the armor-piercing performance was better than that of the 88mm KwK 36 gun, which was mounted in the much publicized German Tiger tank. The Comet also has two 7.92mm Besa machine guns, one mounted in the turret co-axially with the 77mm gun, and the other in a ball-mounting in the front of the hull. Sixty-one rounds of ammunition for the 77mm are carried, together with 5,750 rounds of machine-gun ammunition.

Special devices were designed for sighting and laying the 77mm and Besa turret guns, and are one of the outstanding features of the Comet. It is not possible to describe these devices in detail, but it can be said that they represent a departure from any previous practice in many respects; the methods of sighting and laying insure the greatest possible accuracy at all combat ranges, and with this equipment the 77mm is at present the most accurate British tank gun.

The adoption of the 77mm gun made it necessary to increase the diameter of the turret ring to 64 inches, which is 7 inches more than that of the Cromwell. The over-all dimensions of the Comet are also slightly bigger. It is 21 feet 3 inches long, 10 feet 1 inch wide, and 8 feet 9 inches high, and weighs almost 33 tons.

Established British Lay-Out

The general lay-out of the tank follows established British design, and a crew of five men is carried. These

*Fifth Royal Inniskilling Dragoon Guards.

are the driver, hull-gunner, commander, turret-gunner, and loader wireless-operator, the last three being accommodated in the turret. The turret traverse is power-driven, and has a full traverse of 360 degrees.

The radio equipment in the Comet is most comprehensive. Basically, it follows previous practice, allowing simultaneous telephonic communication on two channels, one to higher formations within medium range, and the other to tanks within short range; the usual inter-communication between members of the crew is also provided. In addition to these facilities, which have been standardized in British tanks for several years, there is a further radio-telephone channel for communication with the infantry or other troops with whom the tanks may be coöperating.

In several respects the appearance of the Comet is similar to that of the Cromwell, but there are two features which prevent confusion between the two. One is the external gun mount, and the shape of the turret, which is more squat on the Comet. The other is the four rubber-tired rollers on each side of the Comet which carry the top run of the track.

The remaining suspension details follow the usual design for British cruiser tanks: Christie high-speed suspension is employed, with five large road wheels on each side; and a Rolls-Royce "Meteor" petrol engine of 600 horse power, which gives the Comet a maximum speed on roads of approximately 32 miles per hour.

Transmission and Steering

The transmission and steering system do not call for any particular comment; the Merritt-Brown controlled differential steering system is employed, which gives a positive drive to both tracks at any radius of turn. This system was first used on the Churchill tank, and since then it has been standardized on all British tanks. It is very compact, making it possible to accommodate the entire engine and transmission in the compartment of the hull behind the turret. Two rear sprocket wheels transmit the drive to the tracks.

The Comet was first used in action in the exploitation that followed the Rhine crossings, and it formed the equipment of the well-known 11th Armored Division in its advance from the Rhine to the Baltic. During the last 46 days of the war in Europe, the exploits of this division were continually in the news, and its progress could be followed as it moved forward through Osnabruck, Luneburg, and Hamburg. It was a severe trial for a new tank which, although severely tested during its development, was being subjected for the first time to the special strains of battle. As has already been stated, excellent reports were received of its performance and reliability.

The Comet is standard equipment in armored regiments, and it has the peculiar distinction of being the only British tank which has never been in action outside of Germany.

*Artificial Moonlight**

ABOUT three years before the war a new special searchlight was accepted by Britain's War Office. It was later mounted into a tank turret and, for security reasons, called the Canal Defense Light.

There was nothing new about the principle of this particular invention, but it had certain distinct advantages over previous models. The inventors had succeeded in mounting inside the limited space of a tank turret a power unit capable of producing a light of several million candle power. This could be projected through a narrow slot to produce a flat beam, roughly fantail in shape, and later known as "artificial moonlight," which would cover a frontage of about 350 yards at a range of 1,000 yards. The light could not be extinguished by small-arms fire, although it was vulnerable to antitank weapons. It also had a flicker device, which it was claimed would dazzle onlookers and might induce temporary blindness.

During the months before D Day it was found that some of the earlier claims for the light had been slightly extravagant, but that the CDL had two definite advantages worth exploiting.

First, when CDL tanks were used to light up a wide front it was possible locally to turn night into day, and thus enable the pursuit of a defeated enemy to continue throughout the 24 hours. Even if not augmented by infantry the aimed fire power of the tanks and artillery was impressive; direction-keeping during a night advance or assault was greatly facilitated, and might prove decisive against an enemy on the run.

Secondly, at night the light provided an improvement of the age-old adage, viz: attack with the sun behind you and in the eyes of the enemy.

Various American units were trained, and equipped, and went with the British-trained groups to the Continent. The Normandy bridgehead breakout went so fast that it was impossible to use CDL. At a later stage, however, one squadron joined the 79th Armored Division and by protecting the bridges and ferries from floating mines and saboteurs played a very useful rôle in the Rhine and Elbe crossings.

The CDL has never been used in a mobile rôle against the enemy, although had the special CDL tanks been available, definite opportunities for their use were presented in a number of operations. Research and development of the idea will continue, for any form of artificial illumination which can assist armor in keeping its direction and in producing aimed fire by night will surely plan a part in future wars.

*British Information Service.

BRIEF FOR A CAVALRY COMBAT PLATOON

by Captain Stuart J. Scherer

DURING 11 months of combat in 4 ETO campaigns, our cavalry reconnaissance troop participated in only two periods of breakthrough—at St. Lo and again after the Rhine River crossing. Breakthrough operations in which the troop received a number of straight reconnaissance missions were rare. On all other occasions it was called upon to perform any mission from attacking a town to holding a sector on the Siegfried line.

"Reconnaissance" was a misnomer from the troop's point of view. We were really cavalry *combat* troops and, unfortunately, not organizationally conceived with that in mind. It was with a feeling of insecurity that the troop frequently received orders to attack dismounted (with our radio operators, drivers, and 37mm gunners) in improvised infantry fashion.

An occasional field expedient was to attach a platoon of doughboys to the troop. This helped immeasurably, but it also revealed that the troop lacked organic riflemen to perform the type of missions usually assigned to it.

The solution lies either in restricting the type of mission to be given cavalry troops, or in changing the organization so that it is better prepared to accomplish a job of average difficulty. Experience proved that the latter is more realistic, because few higher commanders can afford to hold cavalry troops for specialized missions only.

The platoon is the basic tactical unit in our army organization. Combat showed that the platoon leader usually required a squad or two of doughboys to work efficiently through towns and woods. In defensive positions, the riflemen were needed for security and patrolling. With this in mind, the following is proposed:

Cavalry Combat Platoon (Proposed)

		Personnel
3 x ¼-ton Trucks	1 Officer	11 Enlisted Men
2 x Armored Cars		8 Enlisted Men
2 x Personnel Carriers ..		20 Enlisted Men
Total	1 Officer	39 Enlisted Men

Present Cavalry Reconnaissance Platoon

		Personnel
6 x ¼-ton Trucks		18 Enlisted Men
3 x Armored Cars	1 Officer	11 Enlisted Men
Total	1 Officer	29 Enlisted Men

The advantages of the proposed organization are:

1. *Economy of vehicles.* The platoon would have 7 vehicles instead of 9. Experience showed that frequently the fight to advance becomes a fight for roads. Nine vehicles will stretch out about 500 yards along a roadway and if tanks or assault guns are attached, the column becomes longer and even less wieldy. Since the firepower of rear vehicles can seldom be employed, the reduction in vehicles is a definite advantage in making the platoon more compact, more easily camouflaged in the vehicle park, and will also save in maintenance.

2. *Control.* Under enemy fire it is difficult to form the men from several vehicles into dismounted teams. It is time-consuming and inefficient despite training and standard operating procedures. In the proposed set-up, a team which rides together in a personnel carrier for dismounted action is a part of each cavalry combat section. The importance of a vehicular team can hardly be over-emphasized.

3. *Tactical Employment.* A dismounted-mounted platoon team will be of inestimable value for the missions cavalry has been assigned. Its vehicles also are present for performing any mounted reconnaissance mission, for example: the ¼-ton as a point covered by another ¼-ton, or armored car; or the armored car as point covered by the other armored car. (One of our platoons used the latter formation from the breakthrough at St. Lo until we reached the Elbe River.)

4. *Security.* An organic squad of dismounted riflemen and BAR team in each personnel carrier would give the cavalry combat section the security it needs when in contact with the enemy. The mission of outposting a town or fortified position also would be simplified.

The proposed cavalry combat platoon provides the platoon leader with the needed organic riflemen. The practice of attaching doughboys from other units, or even establishing a rifle troop within the squadron, is not an adequate solution to this fundamental organizational problem. The basic tactical unit must have these men as a permanent part of its organization in order to accomplish the missions usually assigned to it.

Mobile Patrol Troops Stalled Four Weeks By Lack of Gas

From Stars and Stripes, January 7, 1946

by William Jordy, Staff Writer

PROPOSALS to concentrate military might in a scattering of highly-mobile Army units for the purpose of occupying the U. S. Zone of Germany may collapse for lack of gasoline, if the immobilized Troop B, 25th Mechanized Cavalry Reconnaissance of the 4th Armd. Div. is a sample of the plan in action.

Charged with patrolling approximately 80 square miles of the mountainous landkreis of Regen and Grafenau bordering on the Czechoslovakian frontier, this unit has not sent out a patrol within the past four weeks.

While half-tracks and armored cars sit in a snow-covered motor pool, the cavalrymen fill in their idleness by patrolling Zwiesel on foot, to make this tiny mountain hamlet perhaps one of the most heavily-guarded areas in the ET. The remainder of their territory goes without protection.

The same situation prevails in other "highly mobile" patrolling outfits in this area.

Protection is badly needed here, Troop Commander Lt. Thomas Jamison of Pasadena, Calif., believes, since a recent shakedown in Zwiesel netted one SS escapee, 49 persons without passes on their persons and a considerable number of curfew violations. While the misdemeanors, with the exception of the escapee, were minor, they did indicate, the lieutenant asserted, that the people were getting careless and that an occasional show of force was good psychology.

Many Violations Reported

The troop has heard of numerous such violations in the near-by town of Regen, together with threats made by German youths against certain girls who went with U. S. troops. But there is no gas to make the 11-mile trip for the shakedown.

The only other soldiers in the two landkreis "protected" by Troop B are those in two eight-man MG detachments in Zwiesel and Grafenau, a Signal Company sent to Grafenau without arms, and a scattering of GIs and officers in a few plants now under Third Army control. Troop A, whose gasoline shortage is similar to that of Troop B, is assigned to border patrol in the area.

If attacks were made on these weakly armed outfits, Lt. Jamison said, they would be wasting their time to telephone to Zwiesel for assistance.

"Of course," he added, "we might be able to hitch a ride on civilian transportation."

There is some arrangement whereby a truckload of gasoline could be rushed from 4th Armd. Div. Headquarters in Regensburg, 80 miles away, in the event of an emergency. S/Sgt. Thomas W. Carnall of Mansfield, Mo. estimates that it would take a half hour to an hour of towing before the frozen, multi-geared armored cars and half-tracks could be turned over, even with tanks full of gasoline.

Idle Cars: Frozen Batteries

Sgt. Carnall said that each of his vehicles should be run for a half hour daily. As a result of our weeks of idleness, seven batteries have already frozen, along with bone-dry fuel lines and gas tanks.

"Actually," he said, "we don't know whether these vehicles would run or not. You never know what's wrong with them, unless you can run the motors every day."

Of the 44 vehicles carried as T/O equipment by this organization, only four were operating when a reporter visited the troop. These—two six-bys and two peeps—are used solely for troop administration. The remaining vehicles are so dry that when Lt. Jamison requested Sgt. Carnall recently to line up the motor pool, the sergeant was unable to budge the rolling stock the one or two feet required to do the job.

Lt. Jamison asserts that 1,750 gallons are needed to fill his tanks, plus an additional 750 gallons for a week's operation.

At present the troop receives an allotment of 240 gallons of gasoline weekly. According to 1/Sgt. John Marker of Mansfield, Ohio, the troop breakdown allows 140 gallons for cooking, 50 gallons to operate a six-by to Cham, 48 miles away, for rations three times weekly and 50 gallons for a peep making a daily trip for mail and other errands.

When a near-by MG detachment borrowed a five-gallon can of gasoline from the troop one day last week, the troop ate a cold breakfast the following morning.

Troop B is hopefully looking forward to receiving horses.

MULES FOR CHINA*

by Captain John A. Rand, F.A.

A description of the difficulties that were encountered when 900 mules were herded 750 miles from Burma into China, with recommendations by the author as to how some of the mistakes that were made could have been avoided.

HOW would you like to be given the task of herding 900 mules on a 750-mile trip? Such a task was assigned and performed. The time—May 26, 1945; the route—Myitkyina, Burma, to Kunming, China; the purpose—to provide mules for Chinese artillery units. The movement was initiated by China, and the Northern Area Combat Command at Myitkyina was in charge of preparations.

The mules chosen were largely from the 612th and 613th Field Artillery Battalions; the remainder were selected from other elements of the Mars Task Force. All the mules had been through combat in North or Central Burma campaigns.

Personnel included two officers and sixty-two enlisted men then on duty with mules in Myitkyina, plus six officers and 130 enlisted men flown from Kunming to Myitkyina for this mission. In addition, twenty-five enlisted men were detailed from the 13th Medical Battalion. This made a total initial strength of 240 officers and men.

Preparations were hasty, as we were given the first alert on May 15th. All mules had to be shod; equipment had to be drawn and fitted, and personnel organized for the movement by May 24th. The animals were broken down into three serials of 300 each, to travel one day apart. About six officers and enlisted men were reserved for overhead supply and administration; remaining personnel was divided equally among the three serials. Each serial had one veterinary officer and three enlisted veterinary technicians; one medical officer, and two enlisted medical technicians.

The first serial left Myitkyina on May 26th, the second on May 27th, and the third of May 29th. Taking the Myitkyina-Tengchung cutoff, they crossed the China border on June 2nd, 3rd, and 4th, respectively. One day's march from there, at Kuyung, we laid over three days to catch up on shoeing, which had been impossible in the difficult mountain bivouacs we had been through, and to reconnoiter the Tengchung-Paoshan cutoff. This latter proved not to be feasible, as the bridge over the Salween River on that trail was far too high and narrow, and very unstable. Therefore we proceeded through Tengchung to Lungling and the Burma Road.

The first elements reached Kunming on July 28th, the total distance covered being approximately 750 miles. Our total marching days were forty-seven; average distance per marching day, sixteen miles.

The second serial waited at Tsuyung seven additional days to allow the first serial time for re-shoeing and veterinary processing at FATC, Kunming, before proceeding east for issue to the Chinese. When the second serial reached Kilo 51, on July 30th, transportation had broken down to the east and all serials were held in place indefinitely. The third serial never left Tsuyung.

During this delay, surra, a communicable blood disease, broke out among the mules. Veterinary personnel of CCC, SOS, and FATC collaborated in a program of testing and isolation, and it was hoped that a new drug then being developed in the United States could be procured. At this point the war ended and the problem became one of disposition of the animals to Chinese SOS. It was decided, about September 1st, to destroy all infected animals, and this was accomplished immediately. Those first serial animals which showed a negative test were distributed to Chinese Pack Artillery Battalions in training at FATC, Kunming. About September 6th, on the advice of competent veterinary officers, the Commanding General, SOS, USF, CT, decided that the remaining animals of the second and third serials should be destroyed. This was a wise decision which undoubtedly prevented a wide spread of the disease.

During the entire trip the weather was inclement, loss of feed through spoilage was often as high as 50 per cent, and marching conditions on the Burma Road were hard, necessitating constant re-shoeing and corrective hoof treatment. In the early part of the trip evacuation of animals was next to impossible.

For the first forty days the entire command lived on 10-in-1 and mountain rations. After twenty-five days I obtained some Class B funds, and was able to buy eggs occasionally. It was also necessary to buy wood for cooking and for boiling water. Shortly before reaching Yunnanyi we drew B rations, and at Yunnanyi we were given partial pay and PX rations for the first time in approximately forty-five days.

Medical evacuation was difficult, and many of the

*The Quartermaster Review.

men at the outset and during the trip suffered from chronic dysentery and fevers of unknown origin. Three cases of scrub typhus occurred, and many evacuations were necessary, but there were no fatalities. Atabrine suppressive dosage was maintained, and drinking water was boiled throughout.

The men performed an extraordinarily arduous task, and are to be commended for their devotion to duty despite difficult supply problems, very hard work, and unfavorable weather and field conditions.

From personal observation and experience as officer in charge of this movement I would like to make the following recommendations in the event that such an operation should ever be contemplated in the future.

We were ordered by Headquarters in China to pack all but riding mules and load them fully throughout the trip. We made a strong objection to this, as we had not enough men to keep packsaddles properly adjusted, and I knew from personal experience that it would mean sore backs and unnecessary exhaustion for the mules, besides useless wear and tear on the saddles and a lot of extra work for the men. In the end we packed 500 mules as far as Paoshan and, in the meantime, I flew to Kunming and obtained authority to turn in 400 saddles and to draw three more trucks. Up to that point we were grossly understrength, and, as a result, skinned a good many backs and exhausted a good many men. From Paoshan on, our strength was just right, and the mules arrived at the end of the trip with clean, healthy backs. The following strength figures should be approximately correct for any future movement of this sort: If route or terrain precludes the daily use of vehicles, necessitating packing of equipment, rations, and forage, there should be two men for each three mules, and mules should be led. If trucks can be used, one man will suffice for each four mules, stripped, and mules should be loose-herded. With this method, for each 300 or 400 mules there should be three trucks and one light vehicle, and one additional truck for forage stocks not more than six days' march away. This provides adequately both for supply and for transportation of mess and horseshoeing personnel and equipment.

Until we reached Paoshan we fed Indian grain, which had suffered a large percentage of spoilage. From there on we fed native horse beans. Good quality long-forage not being available, grazing proved essential, and I think our determined effort to utilize all available grass made a great difference in the final condition of the animals. Yunnan province is made up largely of steep bare hills and rice fields, the latter taking up almost all fertile ground, and it was difficult to find decent grass. Nevertheless overnight bivouacs were chosen entirely with this in mind, and each stop afforded maximum grazing facilities unless this was wholly incompatible with reasonable marching distance or water requirements. Mules were grazed a minimum of three hours a day, loose. Graveyards afforded us more grass than any other kind of area and we therefore found it necessary to camp in them very often.

Maintenance of weight exceeded our highest expectation. At the end of the trip the average drop in weight was approximately 5 per cent, and many of the mules had gained. This may be attributed very largely to the great effort which was made to utilize grass areas.

I consider rate of march to be the next most important factor. Twenty-four miles was the longest day's march; seven miles, the shortest. Just one month out, several mules began to give out, and each day we would have to leave more men behind to bring in the stragglers. This grew to be an alarming condition. In one day we destroyed five mules which had succumbed from pure exhaustion. As the distances had not seemed too great, we decided it must be the pace, which had been six kilometers, or 3.7 miles per hour, so ordered a reduction to a maximum of five kilos, or 3.1 miles, per hour. Each serial commander was given a choice of three methods he might employ to decrease his pace by this amount. He could either march his animals more slowly; halt at the end of five kilos until the hour was up; or, best of all, halt whenever he saw a decent patch of grass along the road. These grazing halts would last from fifteen minutes to two hours, and, though we hit camp each day somewhat later from then on, the mules came in fresh and with a fair amount of extra feed inside them. This is another argument for not loading animals on a march like this. At any spot we could stop and let the mules go immediately to rolling and grazing, unhampered by loads, which would have deprived them of the rest for which the halts were intended.

The other very important factor I would like to point out is provision of suitable animal evacuation facilities. There should be a Veterinary Section camped about every 200 miles, and a number of stock trucks, approximately one per 300 mules, to work between the animal columns and the Veterinary detachments. This was not provided for on our trip, and for quite a long time we could do nothing but shoot any animal which could not immediately continue the march, when a week's rest and treatment would have put him back on the road. These trucks would also be of great help in following the animals from day to day to pick up any that were weak or mildly sick, and thus save them that day's march.

We had an adequate number of horseshoers (about one per 75 mules) and transported them each day by truck so that the minute the mules hit camp the men were fresh and could start right in shoeing. Only by this means could they keep up with the situation. It is interesting to note that we carried along over two tons of shoes, and they barely lasted the trip.

Adequate time should be allowed to prepare for such a move as this. We had less than 10 days to shoe all the mules, draw a lot of equipment, and organize personnel. The last two planeloads of men arrived the night before the trip began. As a result of this time shortage we hit the road just about half-prepared.

The Use of Radar in Ground Combat

BEFORE the end of the war, Signal Corps developments in radar had made possible the long-range plotting of enemy mortar and artillery positions and the detection at night of moving troops and vehicles on enemy-held roads.

Accurate spotting of enemy gun positions at ranges of more than 5 miles was accomplished through radar detection of artillery and mortar projectiles in flight. This was made possible by the use of a specially adapted Signal Corps radar to obtain accurate oscilloscope bearings on both the upward and downward paths of an enemy projectile. From these bearings, the entire trajectory of the shell was plotted and extended geometrically to indicate the exact location of the gun.

Extreme Accuracy

This type of radar had an accuracy of 20 yards in range and one-third of one degree in azimuth (direction), and could spot a hidden gun position 5 miles distant with an error of not more than 60 yards.

The radars used to detect enemy night traffic had the uncanny faculty of being able to track all moving objects in the area covered by the radar beam. These too were standard Signal Corps radars which had been especially adapted for this function.

When an ordinary radar "scans" a stretch of enemy-held road, it detects every object along that stretch of road, and the operators are unable to distinguish the enemy targets from trees, hills, and other features of the landscape. For this reason it was necessary to modify radar sets so that only moving objects would be registered.

This modification was based upon what physicists call the "Doppler effect," and because of it Signal Corps scientists knew that radar echoes would be reflected back at a different frequency from a moving object than from a stationary one. Radar was modified, therefore, to filter out echoes from stationary objects and present only data from moving objects.

With this modification, the radars could be operated much as they were in the tracking of enemy aircraft. Precise data on the range and direction of movement of the enemy vehicle were supplied by radar operators to artillery units, which used that data to aim their guns. The radar could also spot the burst of the shells in relation to the target and tell the artillerymen how to correct their aim.

Radar Ranges

Vehicular targets were detected by radar at ranges up to 16 miles, although 10 miles was the average maximum range. Individual troops were detected at ranges up to three miles, and the radar technicians became so proficient that they could estimate the number of enemy soldiers in a group and the type and speed of enemy vehicles.

Some astonishing results were obtained during the French and German campaigns. On one occasion radar data was used to inform an American patrol of the presence of a German patrol about 200 yards to their right, with the result that the enemy patrol was ambushed.

On another occasion, the radar picked up three self-propelled enemy guns which were moving forward. A battalion concentration dispersed them. At another time a convoy of 40 vehicles was picked up and artillery fire was placed on the area until all movement ceased.

During the month of February, 1945, 9 per cent of the total artillery missions fired by our forces in Germany were on targets located by radar.

Signal Corps scientists first learned that radar could detect shells in flight when they tested the first American radar in 1937. Studying the ability of the radar to automatically aim antiaircraft guns at target planes, they noticed that when the projectiles exploded near the targets they appeared as echoes on the oscilloscope.

Counter-Mortar Use

This fact was considered of only casual interest until the Italian campaign, when combat units reported that enemy mortars were causing more casualties than any other one type of weapon. The Army desperately needed a counter-mortar device, and the Signal Corps suggested radar as the answer to this problem.

Radar sets SCR-584 and AN/TPS-3 were first tested for this function. The SCR-584, an antiaircraft gun-laying set which had already proven very effective in the detection of enemy vehicles, afforded exceedingly accurate data on shell trajectories but was too big for practical front-line use. The Signal Corps turned then to its AN/TPS-3, a lightweight search radar which could be transported by plane or carried by troops to a front-line position. Equipment modifications were developed to make this set more suitable for counter-mortar use. A large tract of wasteland at Island Beach, New Jersey, was set aside for experimentation and testing of the new set (AN/TPQ-3).

Combat infantrymen with extensive mortar experience were detailed to coöperate in the tests and actual combat conditions were simulated as closely as possible. A squad of infantrymen was directed to simulate a mortar attack, with live ammunition. Orders were to select a position, fire one round, and then "move out on the double." The first time this routine was followed, their position was located by the radar within two minutes and counter-fire was directed with such accuracy that the first round landed within 20 yards of the mortar position.

The modification kit which changed the search radar to a counter-mortar radar was so designed that it could be installed or removed in a matter of minutes. Changes to the equipment included the separation of the console from the antenna to permit installation in a foxhole for the protection of the operator.

Mental Health in Military Life*

Nervous breakdowns in combat may amount to as much as ten per cent of total strength. This subject warrants study by every officer.

by Lieutenant Commander Philip Solomon, USNR

MENTAL health is more than the absence of mental disease. It includes such positive elements as self-confidence, alertness, resourcefulness under fire, enthusiasm, good humor, and, in military life especially, resistance to fear—courage. Both in weapons and in men, the best materials will be useless if improperly cared for and controlled. Mental health is as important in the functioning of men as cleanliness, lubrication, proper setting of fuses and fire control are in the functioning of guns. It should be recognized that mental hygiene is as vital as physical hygiene in military life.

In the following topics, various elements that enter into the production of mental health in troops will be discussed.

Proper Leadership

Millions of words have been written about leadership, and many articles and handbooks on the subject are available. It is not the aim in this discussion to summarize, condense or select from this wealth of material, and certainly not to compete with it. The techniques of military leadership are competently taught elsewhere. It is relevant, however, to stress here those aspects of leadership which have particular importance with respect to the NP problem.

Symbolically, the leader represents the father to the enlisted man. The American boy, in general, has been brought up in an atmosphere of family democracy. The successful American father exercises his authority with benevolence, combines firmness with good will, and attempts always to make the child understand the reasons for the orders and rules. The result is a properly balanced attitude toward authority that carries over from the father to the teacher, the teacher to the policeman and so on to employers, club leaders and government officials. Leaders are expected to lead fearlessly, but always in the interests of and with respect for those led.

The officer should always keep in mind this traditional American attitude toward authority. Naturally, in the military setting there are usually limits to the amount of explaining that may be done, and often obedience must be immediate and unquestioning. But the principle may hold nonetheless.

Two common and oppositely directed failings in officers are important in considering mental health of enlisted men. The first is the overbearing commanding officer, who mistakenly overemphasizes curtness, bluster and stern discipline. Such an officer stirs up deep-seated hostility and rebellion in many men. The second is the weak, indecisive officer who vacillates and falters in the pinches. Such an officer generates lack of confidence, apprehension and anxiety.

Either reaction is damaging to mental health and conducive to NP breakdown. The officer who cannot maintain an essentially paternal attitude toward his men may be a satisfactory figurehead but never a true leader. The American fighting man wants neither to be bulldozed nor mollycoddled. He wants only a square deal.

Proper Training

Self-confidence is the antidote to fear. The value of battle-hardened troops has long been appreciated by military leaders. But thorough training can be a good substitute for actual battle. Drills, combat courses, maneuvers, live ammo fire, simulated mines, mortar fire and amphibious landings can be made very much like the real thing. Adding amplified recordings of actual battle sounds would be of additional help. Certainly the field living—mud, lack of comforts, K rations, primitive heads—can be experienced in the form of a pre-exposure which will serve to prevent surprise, disgust and revulsion at a time when such emotions would be damaging in actual combat. Those who cannot take it are best weeded out in training. Every effort should be made to send troops into combat only after they have completed the entire course. Green men as replacements are often considered worse than none at all.

Strategic Orientation

The average American is a thinking being and not an automaton. When he is asked to leave his home and his loved ones to take up arms, he wants to know what he is fighting for. He cannot be expected to do his best unless he is convinced of the vital and inescapable urgency of the Cause. A thorough indoctrination in the causes for which we are fighting should be part of the early training of every man. Material of this general nature may be offered in the form of educational movies, but they should be supplemented by group discussions under capable directors, so that the individual man may ask questions and clear up doubts in his mind.

Tactical Orientation

Not only is it of value to have the individual understand the reasons for war: he should also be made to understand the reasons for the particular military operation in which he is scheduled to take part. Pains should be taken to give him as much information of the tactical situation, all the way down the line, as military security will permit. Probably the greatest advantage that American fighting men have over those of other nations is their aggressive resourcefulness under fire. The way to capitalize on this is to let every man know as much as possible of what is in the wind. Then, in an emergency, he will be better able to fend for himself and perhaps improvise a way out of his difficulty. He will also have greater confidence in himself when he knows that his leaders are willing to trust him.

Rewards

Men do things for many reasons. One of the most universal and most potent of reasons is the desire for reward. In military life, the judicious use of rewards can serve as a powerful agent toward the preservation of mental health.

Rewards may occur at various levels. Perhaps the highest is the reward which a man gives himself—the inner satisfaction of a job well done. This spiritual or philosophic level is the proper concern of the chaplain, and in military life its influence is great. The line officer enters a somewhat lower level. The valuable reward which he may distribute is a well-merited word of praise or appreciation. A sincerely spoken "Good Work!" from his commanding officer can raise a man's spirits for days. Equally important, though less frequently applicable, are letters of commendation, citations and decorations.

At a more material level, reward in the form of a promotion raises a man's ego, epitomizes progress, and what is more significant to many men, means more money. Contrariwise, the lack of promotions, or slow rate as compared with other branches of the service causes resentment and bad feeling.

Further on down the scale, furloughs and liberty time are highly treasured. Again, a liberal policy toward the deserving will pay dividends in greater efficiency, less disciplinary action and better mental health. Comfort items, such as those distributed by the Red Cross, movies, canteens, and the like, are greatly appreciated by the men. They should be made more readily available for the fighting men on their returns from the front, rather than the special prerogative of rear area troops as is all too often the case. This would decrease the hostile feelings held by front-line troops for those in the rear, and would help make them feel, as they should, that they are the cream of the crop.

Finally, at the end of the line, are punishments. Undoubtedly, the threat of punishment is a deterrent to wrongdoing for many men. But threats must not be overdone. Punishments, to be effective, should be swift, sure, scrupulously just, and meted out with full consideration for all attendant circumstances. It is noteworthy that those outfits with the best leaders generally have the fewest disciplinary actions. The desire for approval is far healthier than the fear of disapproval.

Proper classification and assignment.

An attempt is made to place every man in the job he is best fitted to do. Unfortunately there are serious limitations involved. There is need for only a certain number of clerks, carpenters and plumbers. On the other hand, large numbers of riflemen must be provided to do the actual fighting.

There has been bitter criticism that only the flower of our manpower is chosen for "cannon fodder," that the unfit, who could more easily be spared by the nation, are rejected. This is an ironical necessity of warfare. In this connection, attention should be drawn to the widespread error of underrating the requirements for first-class front-line troops. There has been too general a tendency to use "riflemen" as a dumping ground for the leftovers after other jobs have been filled. Every experienced line officer knows the enormous difference between skilled troops and a group of ineffectuals.

Unquestionably, there would be fewer NP crack-ups in combat if the need for a well-integrated personality and mature emotional stability were recognized in combat troops. Just as candidates are screened before they come into the service, they should be screened again most carefully before they are sent into combat. The immature, the unstable, and the dull-witted, to mention but a few, should be kept in rear areas.

Men generally do best what they wish to do. Of course, the military needs must be considered first, and many men will feel they are misrouted. When this is true, their attitude will improve greatly if they are given the benefit of an explanation. They also should be made to realize the importance of routine, uninteresting jobs in war. It bucks a man up to think that what he is doing is important. It sometimes helps to explain to men the fundamental and necessary unfairness of war—the unequal distribution of risks, of awards, of inevitable waste.

Officers are sometimes troubled by the "8-ball," the man who is as helpful as a sore thumb. Such a man is often palmed off onto others as the simplest solution. On occasions this helps, since the man may just happen to find the particular niche where he can get along. More often the problem is aggravated. Misclassification or misassignment may be the cause, and it may be helpful to consult the classification officer. If this fails, the case should be referred to the medical officer, or psychiatrist.

Group Spirit

Man is a gregarious animal. He prefers to share both his pleasures and his dangers with other men.

Experienced officers are familiar with the value of team spirit. At its highest level it is called patriotism and constitutes a sustaining driving force in time of war. It is equally important at lower levels, in loyalty and devotion to the corps, division, regiment, battalion,

*Condensed from article in *The Marine Corps Gazette*.

company, platoon, down to squad and tent-mate. A man will stand and fight for his buddy when he might run away by himself. The cohesive strength of the group, the knowledge that he is not alone in his trouble, will hold a man to his post when all hell breaks loose. This fact must be utilized to the limit in a military organization.

The same group of men should be kept together as much as possible, from their early training on into actual combat. Their pride in their outfits should be encouraged in every way. Officers should be sensitive to this group spirit, take part in it and exploit it to its fullest. When replacements are added to an outfit, they should quickly be indoctrinated into the feelings and traditions of the group.

Other Considerations

No man can be easy in his mind, or put his whole heart and soul in his work if he is worried about conditions at home. Every effort should be made to keep strong the one tie that still binds a man to his home—the mail, all conceivable priority should be given it. Up-to-date news, when it can be provided, is also a boon.

In cases of individual family problems a talk with his officer or the assistance of the Red Cross worker or chaplain may be of great value to the man in trouble.

Nothing is so conducive to high spirits and fresh energy on return to work as an interesting and vigorous sports program. But recreation does not stop at athletics. The movies, at which the soldier can forget himself and the war for a few hours, are a great source of entertainment in every theater of operations. Enlisted men's clubs, Red Cross activities, table tennis, bowling, libraries, game rooms, music, USO shows, hobbies and well-stocked PXs vary in applicability on the military situation, but each in its place can add tremendously to the happiness of the men.

Religion plays an important role in the life of the fighting man. Through religious services he can learn as in no other way the ultimate goals for which the war is being fought. A man also gains a feeling of security and confidence from prayer and his faith that he is not alone. Religion in the field is seldom generated by fear. Rather it is sincere, deep-seated, inspiring and a powerful source of mental health.

Religious observances also are of value as a continuation of accustomed civilian practices, they constitute a strong connecting tie with home and all that home signifies. It goes without saying that every effort should be made to permit men to attend religious services as regularly as possible.

A Fallacy

It is easy to fall into error when dealing with psychological matters. Psychologists themselves do it frequently. Military men would do well to keep their feet on the ground and avoid theoretical speculations in the matter of the mind.

Griping can serve as a healthy safety valve to let off steam. However, if griping reaches serious proportions, the officer would do well to investigate. A man-to-man talk with a few of the offenders may be an eye opener. Perhaps something is really amiss and needs to be set right. In any case, the men will enjoy the chance to get a load off their chests and in many instances will be able to face unavoidable annoyances more calmly afterwards.

Just this sort of attention on the part of officers for their men engenders fierce loyalty "when the chips are down."

Normal Reactions in Combat

Military combat is probably the most abnormal life situation to which large groups of human beings are forced to be subjected. The stresses are rarely duplicated, even in part, in normal living, and are never continued over such a prolonged period. Foremost is the ever-present danger of death or mutilation, the necessity to kill or maim the enemy, to destroy his stores and possessions, to live under conditions of physical hardship, overexertion, extreme fatigue, and often inadequate food, water, sleep or shelter.

A word should also be said regarding the truly remarkable powers of the human body to withstand such maltreatment as occurs in battle over prolonged periods. The ability of the body to adjust to the most trying of circumstances, the latent power and endurance which lie within it are always surprising when the crucial test arrives. When it seems as though exhaustion has reached its utmost, the stimulus of danger or extreme emotion may yet result in a supreme effort and a sudden resurgence of reserve strength.

Mental Health Required

Probably the best defense against combat fatigue is a high state of robust mental health. In actual practice, two regiments in the same division, undergoing the same degree of combat (as indicated by duration and number of killed and wounded in action) may suffer widely different numbers of combat fatigue casualties. The crucial determining factor is the morale of the men, and when the chips are down, morale depends more on good leadership than on anything else. It is the demoralized troops that break down in combat. "Demoralized" means loss of morale.

In any type of warfare, the amount of combat fatigue will depend to a considerable extent on the skill with which the specific causative factors of nervous disorder are avoided. Frequent rotation of troops in the front lines will result in great gains with respect to mental stability and efficiency. When the character of the operation makes this impossible, it still helps enormously if the men can be given some idea as to when their ordeal is likely to be over. The greatest emphasis on providing adequate food, water, and other supplies, including mail, is of course of utmost importance. And the leader must preserve an atmosphere of optimism and good cheer. Nothing demoralizes so much as defeatism.

German Science in the War*

by Colonel Leslie Simon, Ordnance Department

Condensed by Cpl. I. E. Segal from Part XII of "Report on German Scientific Establishments" by Col. Leslie E. Simon, Director of the Ballistic Research Laboratory, Aberdeen Proving Ground, and based on information obtained by Colonel Simon on his tour of Germany during the Summer of 1945.

IT is remarkable that with a very much smaller potential source of research and development personnel, the German government succeeded in maintaining a line of war weapons that were at least comparable to those of the Allies. Considering the changing conditions of warfare, and the period of time, that was a tremendous accomplishment. A few of the outstanding achievements were:

1. An extensive understanding and thorough utilization of hollow charges.
2. A good series of artillery rockets.
3. An understanding and utilization of solid- and liquid-fueled rockets and guided missiles.
4. The use of tungsten-carbide cores in projectiles.
5. Jet and turbo-jet engines.
6. Good anti-aircraft fire control, both optical and radar.
7. Low-velocity, large-caliber automatic cannon for aircraft.
8. Guns of excellent ballistics, particularly the 75mm high-velocity gun and the 88mm series.

With regard to what might have happened if the war had lasted somewhat longer, such a question is always subject to partially undecidable considerations, but some of the obvious threats were:

1. The "V" weapons. A survey of the status of these weapons indicates that they may have an important part in any war of the future, and that geographical remoteness may greatly decrease in or entirely lose its significance.
2. The flak rockets. The theoretical problem of guided missiles was solved, that of "homing missiles" practically solved, and the practical application well under way.
3. The 5.5cm aircraft rocket. This was a result of probability considerations, and only experimental production was in progress. It was stated that six ME262's (turbo-jet fighters), equipped with these rockets, shot down 14 fortresses in a single mission.
4. The P1102. A new very fast turbo-jet-engined Messerschmitt, with swept-back wings to reduce air resistance.
5. Long-range finned missiles shot from guns.
6. Short-range, long, finned projectiles of very great explosive capacity shot from conventional guns.
7. A super-rocket designed to go from Germany to New York in 30 minutes and which carried a pilot for part of the way.
8. Aircraft with the speed of sound.

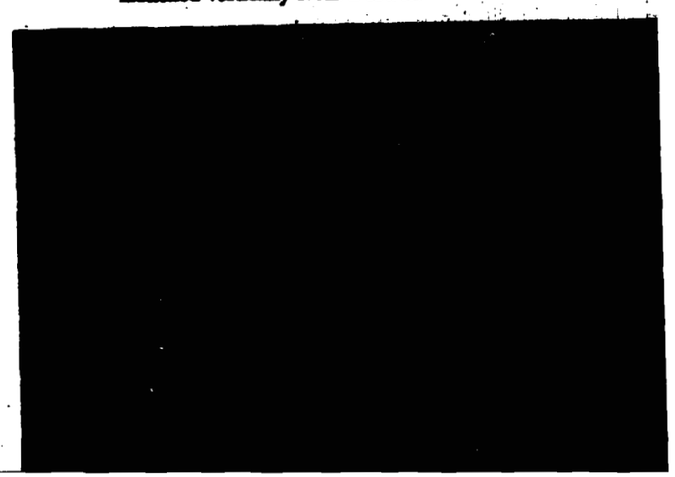
Both psychologically and materially, Germany was well prepared for a sound organization of war research. The German people were marked by a high degree of intellectual self-esteem; they felt that they were an industrious and intellectually proficient race, and that each and every one of them was in a favored position to contribute to scientific effort. In addition to this attitude, which had encouraged a supply of scientists, the Germans had excellent instruments and mechanical work, for which they are noted.

The German attitude of mind was one which invited organization in every phase of life. There was no antipathy to regimentation, and a great respect for constituted authority. Even people whom one might expect to be liberals, such as the scientists, were well-disciplined. Therefore, there was confidence in science, a desire for more and better science, and a willingness to accept an authoritative organization of science.

The official attitude of the Government was less evident. Surely it was not one of opposition to research, for it accepted and financed too much of it for that to be true. On the other hand, it is also evident that there was no definite policy for its exploitation. The explanation appears to be that the government was the officials who administered it, and some were intelligent and some were not.

There existed in Germany the idea of the "master race" by virtue of which it was felt that they should have markedly superior weapons; miracle weapons were hoped for. There was the German weakness for the spectacular—the influence that led to the Paris gun, in

Rocket-propelled "Viper" was a combination interceptor plane and guided missile. It had a "pilot-ejector" and was launched vertically from a tower.



*Firepower.

World War I, which certainly could not have been expected to affect the military outcome—which was undoubtedly a large part of the motivation of the "V" weapons. In short, relative to the exploitation and organization of war research, the Government was willing but not intelligent.

Nearly all German research during World War II was war research. In order to procure supplies or apparatus, a war necessity had to be shown. In the interest of survival, research agencies sought in every way to connect themselves with the armed services, and exploited every avenue of contact, considering it unsafe not to advance their war-necessity status. As a result, research agencies tended to become enmeshed in a complicated net of contracts and affiliations. But research was regarded as the chief means of devising new weapons which would be sufficiently powerful to enable Germany to escape defeat by enemies who were superior both in numbers and in equipment.

Despite the fact that most research agencies were serving several offices, that the various offices exercised varying degrees of control over a number of agencies, and that each research problem was often of interest to a group of offices, the general character of research organization was not extremely complicated. In fact, this overlapping of functions, controls, and interests may not have been harmful. The end product of research is itself so uncertain, and new knowledge is potentially of interest in connection with so many fields, that more rigorously defined avenues of responsibility and authority might have retarded the dissemination of information (which was already considerably hampered by security regulations) and the exchange of scientific information.

The German Air Force had not only the most extensive research facilities, but also by far the most effective and competent organization and personnel. The extensiveness of its research facilities may be partly accounted for by the fact that the Air Force was an agency predicated on new things, and it felt a great affinity for and confidence in the new. On the other hand, the competence of its research and the quality of its personnel are probably attributable to the conditions of research which it fostered. It was hampered by neither an old organization nor a tradition. It built a series of modern research establishments to which it gave exceptional autonomy, and which reported freely and directly to the Air Ministry. In addition to these establishments of its own, it also exploited the academic institutions and the research establishments of the great industrial firms.

The German Army, however, had only a single quasi-military research agency of its own. Like the Air Force, it had contracts for facilities of the academic institutions and firms. Its research was all reported through an office only coördinate with the offices of the development divisions. But the real control of its research and development was in the hands of the manufacturing firms. Likewise, it appeared from any brief investigation that weapons of the German Navy were extremely dependent upon the great manufacturing firms.

The organization of German Air Force research, which was very largely due to one man, Baeumker, incorporated fundamental principles known to men of science but seldom seen in practice outside a few laboratories. The research unit was not too large (perhaps 50 to 100 men) and the research structure was based on the institute. Unscientific interference into the institute was avoided by having it report only to the highest authority for some loosely held powers of coördination and administration which were delegated to intermediate authority.

The importance of congenial social status and comfortable living conditions to the successful and vigorous conduct of research was recognized. Scientists were accorded a place of distinction; it was made possible for them to live in groups; their research buildings were spacious, dignified, well-furnished, and pleasantly situated. Finally, the salaries of the scientists were high, by German standards, though not as high as industrial salaries. It was manifest that these conditions could not fail to have a beneficial influence on the quality and quantity of scientific output, not from the viewpoint of pampering the scientist but from the purely materialistic viewpoint of removing interferences and irritants that would decrease or stultify the flow of ideas.

There were also psychological and physical factors that inhibited the successful functioning of the German scientific organization. There seems to be a sort of idiosyncrasy of the German mind that may be a compensation for its meticulous methodology and studied efficiency. It might be called "susceptibility to error." It is characterized by a carefully laid plan, worked out with infinite detail, except for one vital and missing part. Having done so much so well, the Germans often made a simple mistake which was ruinous to the total effect.

The major error in the conduct of German scientific war research was a case of just one vital and logically obvious element left out of a perfectly magnificent scheme; and both the military and the scientists were partly responsible for it, although the major responsibility rested with the scientists. The major error was simply this: the scientists tried to do research to fill a need when demand was made by the military or specifically by a ministry.

It is somewhat natural for the scientist who is rather separated from military planning to say: "I know my science; tell me what you want, and I will try to get it." However, anyone who is familiar with research knows that it simply cannot be done that way, except rarely. Research takes time.

In summary it may be said that science succeeded in almost everything scientific, acquired a magnificent research organization, produced much that was useful, and failed miserably on a directive feature that would have made its work many times more powerful.

The Soviet Art of War*

THE war between the Soviet Union and Germany ended in a defeat for the enemy greater than any known to history.

The chief events of the war, including the decisive battles of 1944-1945, took place on Soviet soil. The German supreme command constantly stressed the paramount importance of the Eastern Front, and on several occasions transferred troops there from the West.

The Soviet success in the struggle against all the might of Germany's war machine is explained in a considerable degree by our superior theory and art of war.

The highest degree of skill was attained by the Red Army and its commanders during the war, for they constantly analyzed and learned from their rich experience. It must be strongly emphasized, however, that the fundamental principles and the theory of tactics were developed, long before the war began, on the basis of study of the First World War, the Civil War of 1918-1920 and other wars which took place between the First and Second World Wars.

There is no doubt that the early successes achieved by the Nazi armies in the war against the Soviet Union are only to be explained by the temporary superiority which Germany secured by her treacherous and sudden attack on the USSR.

The USSR was able to overcome the difficulties of the first period of war and assume the offensive for the final defeat of the enemy because she depended not only on her tremendous reserves of manpower but to an even greater extent on huge quantities of armaments, first-class in quality, which the industries of the Soviet Union supplied to their Red Army.

The Soviet art of war, the war doctrine of the Red Army, was built up under the direct guidance of such brilliant authorities as Lenin, Stalin, M. Frunze, one of the greatest of the Red Army's early generals, and others. Generalissimo Stalin directed the most important operations of the Civil War and stood at the head of the armed forces of the USSR during the Second World War.

The main theses on which the Soviet art of war is built up, the methods of conducting operations, types of maneuvers, activities in the main direction by large striking forces, the maintenance of supplies for operation, the building up and employment of reserves, and many other points were laid down by Stalin in a number of his prewar works based on a brilliant analysis of the experiences of the Civil War and First World War.

These theses, which were extensively employed by Stalin with such good results during the Civil War, formed the basis of *Red Army Regulations (1936)* and have not yet become obsolete. The main point in these regulations covers most of the typical features of modern warfare—operations in great depth, the growing importance of artillery, tanks and aircraft, and methods of employing them.

The regulations, correctly assessing the growing strength of modern defenses, lay special stress on the importance of effecting a breach in strong previously built defenses, in depth. No less important are the offensive operations planned in the regulations for definite objective operations employing movement and complete encirclement of the enemy.

It will be remembered that many of these Red Army regulations were used in their entirety by the Germans for their own rules and regulations (especially on the use of tanks and airborne troops), and, also, by the Japanese who in the last edition of their field regulations copied a number of points of the *Red Army Regulations (1936)* almost word for word.

The Red Army made a thorough study of the experiences of the past, but studied them from a creative viewpoint, taking into consideration constant changes in technical equipment, and tried, as far as possible, to foresee the characteristic features of the future war.

From the standpoint of theoretical knowledge and training of regular officers, the Red Army was not taken unawares by the Second World War. From the very outset it did not meet with anything that was staggeringly new or unexpected. The Germans, despite the treachery and suddenness of their attack, did not surprise Soviet troops with anything new in the way of operations or tactical methods. On the contrary, the methods used by the German staff were extremely stereotyped on the whole.

The Soviet war against the German aggressor developed on a scale unknown in history, both from the viewpoint of the number of men and machines participating and from the viewpoint of the problems that the Red Army had to solve for the purpose of speedily defeating and destroying the enemy's fighting forces. In view of this the Soviet Command reviewed while the war was in progress a number of these from the *Regulations* concerning the conduct of operations under new conditions.

These were such items as: the planning and conduct of simultaneous operations on a wide front embracing groups of armies and several fronts for the purpose of defeating the enemy's main strategic forces; questions of conduct of continuous offensive operations to a depth of 250 to 300 miles without a lull or a halt; and questions of organization of maneuvers to surround enemy forces, which was only fully developed during the Second World War and became the Red Army's chief method of conducting offensive operations. The problem of frontal attack was extensively developed.

From a narrow use of maneuver to force a breach only in the enemy's tactical depth, the Red Army progressed to the striking of such frontal blows as would split the enemy's operative defenses to a depth of anything up to 300 miles.

The question of the use of artillery was very widely developed, as well as that of employment of tanks and aircraft in modern battles; and the use and cooperation of all branches of the armed forces in depth in defensive and offensive operations.

*By Major General Nikolai Zamyatin, *Soviet Information Bulletin*.

Artillery Offensive*

by Engineer Colonel Pavel Zverev

IN the years preceding the Second World War, military minds were as much occupied with the problem of a break-through of fortifications as with the mass employment of tanks and aircraft. This was dictated by the experiences of the First World War and the tendency to build such powerful fortified areas to protect borders as the Maginot, Siegfried and Mannerheim Lines. In addition, the development of fortifications showed that the construction of field defenses would also be based on the principle of many-lined fortified areas.

These forecasts were confirmed in the majority of Red Army offensive operations during 1942-1945, which invariably began with a break-through of the German defenses. It should also be borne in mind that the farther the Germans were forced westward, the stronger their resistance became. But now that the powerful East Prussian defenses have been shattered, the dozens of fortifications situated between the Oder and Berlin have been overcome by Soviet forces, and under the blows of Allied armies the Siegfried Line collapsed, we may draw the indisputable conclusion that the problem of blasting fortified zones has been solved.

Considering the experience of the Red Army, we may assert that this solution was reached in a new way by the artillery offensive.

There are examples in the First World War where the concentration of artillery was not far below the average of this war. But there can be no comparison in the results achieved in the First and Second World Wars. In those days with the pounding of the enemy's defense zone continuing for days, the break-through operation was protracted and therefore did not yield the desired result, whereas now, as displayed by the Red Army artillery, the preparation continued for no more than 90 minutes or two hours, but the quality of fire was so highly superior that tanks and infantry negotiated the main defense lines in a single day. This was achieved not only by an increasing density of fire, but also by a skillful conduct of barrage—a tactic in which Soviet gunners have reached perfection.

In spite of the fact that in a majority of cases the number of Soviet artillery regiments on the sector of the break-through highly exceeded the number of infantry regiments, the artillery never hindered the operations of the infantry. On the contrary, its fire was completely subordinated to the objectives of the infantry.

Artillery offensive was composed of three main periods: artillery preparation, creeping barrage, and shifting fire deep into the enemy's defense zone.

The first stage is the most intensive, for it engages all the guns in a simultaneous action on the sector of the proposed break-through

An original interesting example of the organization of artillery preparation was provided by the Army of the First Ukrainian Front when German fortifications on the Vistula south of Sandomierz were blasted in January 1945. The main feature was that as a preliminary to the offensive, a short sham artillery preparation was started with only one-tenth of the available guns in action, and a feint attack was begun by a few battalions. The Germans mistook this for the real thing, bringing in all the forces at their command, and the attack was easily repulsed.

But soon the Soviet artillery, 250 pieces for every kilometer of the front, began again to pound the enemy. The barrage went on for over 90 minutes and was so effective that Soviet tanks and infantry made a wide gap in the entire depth of the enemy's defense zone.

Referring to this battle, Colonel Schtresner wrote in his diary: "The Russian artillery fired with amazing precision. In a matter of 15 minutes, communication was completely disrupted. I could not raise my head at the CP. It was quite impossible to direct the operations of the regiment. All my units sustained heavy casualties from gunfire. Those who survived, scattered."

It would be a mistake, however, to think that this was the only method used during the preliminary bombardment. There were hundreds of variations.

But no matter how effective the preparatory barrage may be, there always remain enemy firing points capable of inflicting heavy casualties on the attacking force, or even of checking the advance. For this reason the importance of artillery fire becomes even more significant when the attack is finally launched. If during the period of preparation the fire of each gun is directed to a certain target, then with the attack in progress the batteries can move their fire in strict coördination with the movement of the infantry and tanks.

The change of depth of fire is accomplished either by concentrated action or by setting up a barrage, or by combining the two. But whatever the method employed, Soviet infantry and tanks always moved just ahead of the creeping barrage and crushed every resistance. This wall of fire accompanied the troops for approximately 700 to 1,000 meters from the enemy front-line defenses and continued for about 30 minutes. That brought the second stage of the artillery offensive to an end, and then followed the third period.

This division of the artillery offensive into periods is theoretical, of course, for artillery fire was constant. While the wall of fire was being shifted from the first to the second trench, regimental and antitank guns had already begun to move forward and, following in the ranks of the infantry and firing direct, they silenced

*Courtesy *Information Bulletin*, Embassy, U.S.S.R.

the surviving firing posts, knocked out counterattacking tanks or infantry parties of the enemy. Immediately afterward divisional artillery went into action.

Under this method of organization, the Soviet infantry always had the support of the artillery. Every enemy attempt to counterattack was frustrated by the concentrated fire of the divisional and corps artillery.

At the beginning of an offensive the artillery pounded the enemy defense zone to a depth of 8 or 10 kilometers, but with the advance of the infantry the fire zone naturally diminished, while the number of guns in action remained unchanged. This enabled the attacking force to deal ever stronger artillery blows and retain the superiority of fire power.

The long range of the corps and Army artillery groups, the mobility of the regimental and divisional guns, enabled the gunners to concentrate fire on the entire tactical depth of the enemy's defense zone. This paralyzed resistance, and thus solved the problem of successfully blasting a fortified zone.

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Proximity Fuze Played Vital Role in Defeat of Axis

CHRISTMAS DAY, 1944, had been selected as the date for the first presentation to the enemy of the VT radio proximity fuze, but when the Germans launched the Ardennes offensive plans were immediately changed and the fuzes were committed to battle.

U. S. artillery projectiles, fitted with the pint-sized fuzes which caused the projectile to explode when it was within 70 feet of its target, helped halt Von Rundstedt's offensive. It vastly multiplied the lethal effect of interdictory and harassing artillery fire, and was considered secondary in importance only to the Atomic Bomb.

Use In Rockets

The VT fuze also was employed in the Army's airborne 4½-inch rocket. Extensive tests demonstrated that one out of two VT-fuzed rockets, fired from a fighter plane, could be counted upon to bring down an enemy airplane at ranges up to 1,000 yards. Since the usual fighter plane normally carried six 4½-inch rockets, this meant that a single plane would be able to account for three enemy planes on each mission.

Another use of the VT-fuzed rockets was upon gun emplacements, enemy personnel in foxholes, or airplanes parked in revetments. Tests showed a twenty-fold increase in the number of casualties for the VT, as compared with the results obtained from a rocket which was fuzed to detonate on contact with the ground. Rockets equipped with the VT fuze detonated just above the target, and blanketed the immediate area with a hail of high velocity fragments.

Mass Production

Mass production of the fuzes for airborne rockets was started in the summer of 1942, and by the middle of 1943 nearly a million had been stored for use in the event the enemy ever again threatened to regain control of the air.

Sufficient fuzes had been manufactured for their employment in combat by January 1, 1944, but their general use was temporarily withheld in deference to the safety of Allied aircraft.

The high degree of secrecy which the VT project called for made it necessary to avoid the normal channels of supply. It was therefore necessary to transport great stocks of the fuzes to isolated and well-camouflaged depots in the British Isles, France, Italy and to bases in the Pacific.

Training of Personnel

After the problems of supply had been solved, it next was necessary to indoctrinate artillery personnel with the peculiarities of VT. A detachment of technically qualified officers and men were trained in VT development laboratories, and then sent to theaters of operations throughout the world. Nearly 200 of these newly trained specialists went to Europe and the Pacific.

The first of such teams embarked for England in March, 1944. Its mission was to aid theater personnel in maintaining security, to expedite the movement of supplies, and to indoctrinate ordnance and artillery personnel in the technical nature of the fuze.

Both U. S. and British Army personnel were taught to shoot VT-fuzed shells in such a way that maximum effectiveness would be obtained. The results now are well known. The destructiveness of antiaircraft fire was increased at least five-fold. London was saved.

Universal Military Training*

by Colonel W. A. Graham, Retired

TWICE during a generation the power of the United States has tipped the scales in global war. Each time—by lucky circumstances—we have been afforded time to marshal our enormous strength for battle.

This breathing spell cannot reasonably be hoped for should World War III ever break out. Modern war has sharply increased the length of time needed for preparation. In World War I, 17 months elapsed between the declaration of war and the first major U.S. offensive. There were 30 months between the sneak attack on Pearl Harbor and D Day.

The one and only sound argument against universal military training would be to demonstrate convincingly that the national security does not require it. If the United States could always be sure of enough time to enact the necessary legislation and to train and equip an army for the field, there would be no need of such a program. The ever-growing threat of amphibian operations and of long-range air attack, however, has made it almost certain that the next powerful aggressor against world peace will strike at us first—if we are unprepared.

The argument that volunteers will suffice has been proven false. Experience shows that, for various reasons, the great majority of eligible men will not enlist, and the patriotic and adventurous who do have never exceeded more than 12 per cent of our military needs. In World War II nearly 14,000,000 Americans were required for the armed forces.

Many opponents of universal military training have claimed that it will endanger the ideals of democracy. What is meant by this rather vague assertion is not clear, unless it be that submission to military discipline for a year might tend to weaken individual initiative. Was this true in the North and South after 4 years of civil war? Did the 4,000,000 men of 1917-18 lose their democratic ideals? Have the 14,000,000 who bore arms in World War II lost their individual initiative? These questions are best answered by the veteran's support of a program for universal military training.

The conclusion that military training would inculcate the so-called martial spirit in the United States does not appear to be justified. Many school boys are compelled to take courses in manual training but the schools cannot be accused of fostering an army of carpenters.

Certain educators have voiced a protest against the inevitable interruption of school and college life. Granting that some such interruption would occur, one short year seems a small contribution to the cause of national security when loss of life, of family, of home, and even of country, may be the price of unpreparedness. It is the duty of every man to provide for the common defense of his country.

*Digest of a pamphlet prepared by Colonel Graham.

The need for a universal military program is as old as the Republic itself. It was evident in Washington's day, when he said: "If we desire to secure peace it must be known that we are at all times ready for war." It was even more obvious in the last days of Franklin D Roosevelt, when on the eve of the San Francisco conference, he said: "Universal military training is requisite to our national security."

In 1792 the Congress wholeheartedly endorsed compulsory military training. It was, however, imposed on all men between the ages of 18 and 45, rather than only on those youths who met the physical requirements. The enforced absences of the older men from their various employments would have disrupted the economy of the nation, but the old Militia system served to demonstrate that the principle of universal military training was an integral part of the initial policy of the United States to distribute fairly the obligations of national security.

In enacting such an all-inclusive measure, the Congress had set its judgment against that of every military expert in the country—including such men as Washington, Steuben, Knox, and Hamilton.

In 1783 Washington had submitted to the Continental Congress his "Sentiments on a Peace Establishment," together with the views of many of his generals. While recommending that all members of the Militia be enrolled, he laid especial emphasis on training "only the youth and younger men." To accomplish this he recommended the formation of what he termed the "select corps" which would be chosen from the then existing regiments of Militia. In time of national emergency these would be merged to form a trained and disciplined force, ready and equipped for immediate action. The great body of the Militia, consisting of the older men, would be held in reserve, and called up as a last resort.

Both the Regular Army and the National Guard (which in 1903 supplanted the old-time Militia) normally depend upon voluntary enlistments to fill their ranks. This system, because of its prevalence in our wars before 1917, has come to be regarded erroneously as America's "traditional system" of raising her armies. It was not the system of the founding fathers, as has been shown.

It should be emphasized that the word *conscription* to describe compulsory training is both misleading and inaccurate. Conscription is forced military service. The word has never been employed in any other sense. *Military service* means active duty in the Army or Navy, subject to the orders of commanding officers to move against an enemy.

On the contrary, *military training* means that the

men who undergo it will be instructed as pupils, not employed as practitioners of the military art.

They will not constitute a "huge peacetime Army" or perform military service—compulsory or otherwise—nor will they be the subjects of "peacetime conscription." During the period of training they will not be servicemen at all.

When their one year's training is completed, they *will* be inactive members of a *trained* reserve and subject to a call to active duty by the Congress only in case of a national emergency.

No American military system, no matter what the plans of the War Department may be, can continue to endure or to exist against the will of the Congress which controls the necessary funds; and if the people—the men and women who constitute the voting public—desire that universal military training be discontinued at any time following its adoption, they can and will say so at the polls in no uncertain terms.

The decision now rests with the representatives of the people—the Congress of the United States.

The present age has come to be known as the "era of the common man." He has the greatest stake in his country's future, for he composes the great majority of our people. To him will always fall the duty and the burden and the honor of fulfilling the basic purposes of the Constitution, among which is the obligation to provide for the common defense.

Individual Combat Stories Wanted

Combat against the enemy is generally a team play by troops, but often it is a contest of man against man. Victorious action against the enemy does not always come from a concerted attack by a squad or larger group. Quite frequently it is made possible by the bravery and tactical ingenuity of its leader or one of its individuals. Many of our readers undoubtedly know of instances where the success of a mission was made possible because of the action of an individual or a small group. Please write it for us in 1,000 words, or more . . . the exact details of how he, or they, did it. Although such actions probably resulted because of the personal bravery of those involved, we are interested in the tactical side and the details of what made it click. Describe the moves that were made in the action . . . the distances involved . . . disposition of the enemy and that of the attacking personnel . . . weapons used . . . the difficulties and obstacles met, and how they were overcome . . . if surprise was a factor, and how it was achieved . . . any unusual behavior of the enemy, how he met the attack, how he reacted—Jap, or German. Send it, with pictures if possible, to The Cavalry Journal, 1719 K St. N.W., Washington, D. C. These stories are very important for future study, as they can be used as examples for the training of our future armies.

The National Guard Program

Officer Training Course

AS a preliminary step toward the postwar National Guard, courses have been established to "orient and train selected officers for duty as instructors," it has been announced by General Jacob L. Devers, commanding general of Army Ground Forces. These courses, taking advantage of past experience, in peace and war, are designed for uniform results and to "start all National Guard instructors on a sound basis."

There will be three separate programs, one for senior state instructors, one for officer instructors other than senior state instructors, and one for sergeant instructors.

Senior state instructors, who will report to the state capital concerned approximately one month prior to the actual reorganization of the National Guard within that state, will first attend a 10-day "orientation course" in Washington, D. C. It will largely embrace study of War Department policies, National Guard history, and typical training and administrative problems. The Chief of Staff, United States Army, and the Commanding General, Army Ground Forces, are scheduled to appear before this school, together with outstanding army officers previously National Guard senior instructors and also successful in World War II combat.

The courses for officer instructors other than senior state instructors will run for 30 days at the Infantry, Field Artillery, Armored, Cavalry and Antiaircraft Artillery Service Schools. Each course will have an original capacity of 100, with a class of 50 starting every two weeks thereafter, and will offer refresher instruction on the latest tactics and technique, and general orientation on the War Department and the National Guard.

The courses for sergeant instructors, also running for 30 days at the Service Schools with 100-pupil capacities, will take up the same general orientation subjects and in addition drill on specific duties to be performed.

* * *

Tentative state allotments for the postwar National Guard have been forwarded to the governors of the states and insular possessions. The total strength of the postwar National Guard as presently contemplated by the War Department approximates 622,500 officers and enlisted men. The aggregate of National Guardsmen inducted into Federal service prior to the war was 300,034.

The planned strength calls for about 571,000 officers and men in the Ground Forces and 47,600 in the Air Forces. The prewar National Guard comprised approximately 295,000 in Ground Forces and about 5,000 in Air Forces, the latter composed of 19 Observation Squadrons (Divisional Aviation) and an additional 10 activated just before the war. In the postwar Ground Forces the principal units will be about 22 infantry divisions, two armored divisions, and 18 regimental combat teams. The postwar Air Forces will include about 12 wings, 27 groups, and 84 squadrons, as well as 12 control and warning groups.

In letters authorizing the allotments, the governors have been requested to undertake an immediate survey of their capabilities for recruiting and maintaining their respective allotments. In the event that changes are necessary, the National Guard Bureau indicated that the allotments may be altered.

Under War Department policy, it is normally the responsibility of the states to provide and maintain armories and storage facilities adequate for the housing of personnel and the storage of equipment. Such adequacy will be determined by Federal inspection and approval. The recruiting of personnel is also the responsibility of the states.

The state tentative allotments are:

STATE	GROUND	AIR	TOTAL
NORTHEAST AREA:			
Connecticut	10,609	789	11,398
Delaware	2,382	312	2,694
Maine	6,454	384	6,838
Massachusetts	21,056	1,506	22,561
New Hampshire	5,726	312	6,038
New Jersey	19,978	696	20,674
New York	44,112	3,665	47,777
Rhode Island	4,243	703	4,946
Vermont	3,563	312	3,875
EAST CENTRAL AREA:			
District of Columbia	2,600	789	3,389
Kentucky	7,696	284	7,979
Maryland	8,994	312	9,306
Ohio	19,982	2,551	22,533
Pennsylvania	36,632	2,948	39,580
Virginia	12,570	312	12,882
West Virginia	5,426	312	5,738
SOUTHEAST AREA:			
Alabama	10,128	1,104	11,232
Florida	7,220	312	7,532
Georgia	10,880	1,505	12,385
Mississippi	6,684	312	6,996
North Carolina	10,970	717	11,687
South Carolina	7,396	312	7,708
Tennessee	10,622	696	11,318
NORTH CENTRAL AREA:			
Colorado	5,174	1,989	7,163
Illinois	30,735	2,173	32,908
Indiana	16,237	1,087	17,324
Iowa	10,989	1,101	12,090
Kansas	7,377	312	7,689
Michigan	22,599	1,416	24,015
Minnesota	12,403	1,087	13,490
Missouri	11,576	1,522	13,098
Nebraska	5,376	312	5,688
North Dakota	3,694	312	4,006
South Dakota	4,173	312	4,485
Wisconsin	15,089	1,101	16,190
Wyoming	1,097	312	1,409
SOUTH CENTRAL AREA:			
Arkansas	7,025	312	7,337
Louisiana	10,403	703	11,106
New Mexico	3,762	312	4,074
Oklahoma	13,226	696	13,922
Texas	27,082	2,239	29,321
WESTERN AREA:			
Arizona	3,788	312	4,100
California	34,949	4,619	39,568
Idaho	5,304	312	5,616
Montana	3,788	312	4,100
Nevada	794	312	1,106
Oregon	9,009	775	9,784
Utah	4,393	312	4,705
Washington	10,712	1,526	12,238
INSULAR:			
Hawaii	8,595	312	8,907
Puerto Rico	9,693	312	10,005

The postwar National Guard contemplates the continuation of many of the units closely identified with the

military history of their states of origin. Of necessity, the expansion of the National Guard Air Forces calls mainly for the activation of new units but all the former National Guard air units will be reactivated.

The principal ground and air components as proposed to the governors of the various states are as follows:

NORTH EAST AREA: *CONNECTICUT*—two regiments of the 43rd Division, one aircraft control and warning squadron, one fighter squadron; *DELAWARE*—one fighter squadron, coast and antiaircraft artillery units; *MAINE*—one regimental combat team, one fighter squadron; *MASSACHUSETTS*—the 26th Division, 51st Headquarters and Headquarters Squadron, one control and warning group headquarters, two fighter squadrons; *NEW HAMPSHIRE*—one fighter squadron, one regimental combat team; *NEW JERSEY*—the 44th Division, two fighter squadrons; *NEW YORK*—the 27th Division, one regimental combat team, 52nd Wing Headquarters and Headquarters Squadron, three control squadrons, one light bombardment group headquarters, four fighter squadrons; *RHODE ISLAND*—elements of the 43rd Division, one control squadron, one fighter squadron; *VERMONT*—one regiment of the 43rd Division, one fighter squadron.

EAST CENTRAL AREA: *DISTRICT OF COLUMBIA*—one control and warning squadron, one fighter squadron, miscellaneous antiaircraft units; *KENTUCKY*—one fighter squadron, one regimental combat team; *MARYLAND*—two regiments of the 29th Division, one fighter squadron; *OHIO*—the 37th Division, 55th Wing Headquarters and Headquarters Squadron, two control squadrons, one light bombardment squadron, three fighter squadrons; *PENNSYLVANIA*—the 28th Division, one regimental combat team, 53rd Wing Headquarters and Headquarters Squadron, two control squadrons, two light bombardment squadrons, three fighter squadrons; *VIRGINIA*—one regiment of the 29th Division, one regimental combat team, one fighter squadron; *WEST VIRGINIA*—one fighter squadron, one regimental combat team.

SOUTH EAST AREA: *ALABAMA*—two regiments of the 31st Division, one control and warning squadron, one light bombardment squadron, one fighter squadron; *FLORIDA*—one regimental combat team, one fighter squadron; *GEORGIA*—two regiments of the 48th Division, 54th Wing Headquarters and Headquarters Squadron, one control squadron, two fighter squadrons; *MISSISSIPPI*—one regiment of the 31st Division, one fighter squadron; *NORTH CAROLINA*—one regiment of the 30th Division, one control squadron, one fighter squadron; *SOUTH CAROLINA*—one regiment of the 48th Division, one fighter squadron; *TENNESSEE*—two regiments of the 30th Division, two fighter squadrons.

NORTH CENTRAL AREA: *COLORADO*—59th Wing Headquarters and Headquarters Squadron, three control squadrons, one fighter squadron, one regimental combat team; *ILLINOIS*—the 33rd Division, one regimental combat team, 56th Wing Headquarters and Headquarters Squadron, one control squadron, two light bombardment squadrons, two fighter squadrons; *INDIANA*—the 38th Division, one control squadron, two fighter squadrons; *IOWA*—two regiments of the 34th Division, one control squadron, two fighter squadrons; *KANSAS*—one regiment of the 35th Division, one fighter squadron; *MICHIGAN*—the 46th Division, one light bombardment squadron, one control squadron, two fighter squadrons; *MINNESOTA*—two regiments of the 47th Division, one control squadron, two fighter squadrons; *MISSOURI*—57th Wing Headquarters and Headquarters Squadron, one control squadron, one light bombardment squadron, one fighter squadron, two regiments of the 35th Division; *NEBRASKA*—one regiment of the 34th Division, one fighter squadron; *NORTH DAKOTA*—one regiment of the 47th Division, one fighter squadron; *SOUTH DAKOTA*—one regimental combat team, one fighter squadron; *WISCONSIN*—the 32nd Division, one control squadron, two fighter squadrons; *WYOMING*—one mechanized cavalry reconnaissance squadron, one fighter squadron.

SOUTH CENTRAL AREA: *ARKANSAS*—one regiment of the 39th Division, one fighter squadron; *LOUISIANA*—two regiments of the 39th Division, one control and warning squadron, one fighter squadron; *NEW MEXICO*—elements of the 49th Armored Division, one fighter squadron; *OKLAHOMA*—the 45th Division, two fighter squadrons; *TEXAS*—the 36th Division, elements of the 49th Armored Division, 58th Wing Headquarters and Headquarters Squadron, two control squadrons, one light bombardment squadron, two fighter squadrons.

WESTERN AREA: *ARIZONA*—one regimental combat team, one fighter squadron; *CALIFORNIA*—the 40th Division, elements of the 50th Armored Division, 61st and 62nd Wing Headquarters and Headquarters Squadrons, six control squadrons, one light bombardment squadron, three fighter squadrons; *IDAHO*—one regiment of the 41st Division, one fighter squadron; *MONTANA*—one regimental combat team, one fighter squadron; *NEVADA*—one cavalry reconnaissance squadron of the 50th Armored Division, one fighter squadron; *OREGON*—one regiment of the 41st Division, elements of the 50th Armored Division, one control squadron, one fighter squadron; *UTAH*—one regimental combat team, one fighter squadron; *WASHINGTON*—one regiment of the 41st Division, 60th Wing Headquarters and Headquarters Squadron, two control squadrons, one fighter squadron.

INSULAR POSSESSIONS: *HAWAII*—two regimental combat teams, one fighter squadron; *PUERTO RICO*—two regimental combat teams, one fighter squadron.

The Organized Reserve Corps

OFFICERS of the Organized Reserve Corps today are giving serious thought to future policies and plans for the training and employment of this vital force in our National Security System. This is shown by the marked increase of memberships in the Reserve Officers' Association, and the Organized Reserve Corps.

The plan drafted for the United States Military establishment calls for a three component set-up: the Regular Army, the National Guard and the Organized Reserve Corps.

The Organized Reserve Corps will be composed of the Active Reserve, and an Inactive Reserve. The Active Reserve will consist of those individuals and units sufficient in numbers and types which will, together with other components, constitute an over-all balanced force in the Army of the United States. The number and types of units to be activated will be dependent on the approved War Department Troop Basis for the Organized Reserve.

The plan calls for the organization of the Reserve component into three classes. Class A will include fully organized units, complete with full T/O complement of officers and enlisted men with all organizational equipment. Class B units will be provided with a full complement of officer personnel and enlisted cadre plus a portion of unit equipment. Class C units will be those provided only with a full complement of officer personnel.

Allocation of these units will be based on: the density of male population of military age within certain sections of the country, in order to provide proper distribution of the units within military areas; the availability of personnel for the units requiring technically trained personnel; and the availability of regular army and National Guard units to facilitate training.

Reserve Units will be organized initially as Class C units and will progress through a prescribed training and organizational cycle until they have reached Class A.

Officers who receive assignments in one of these units will be assigned in the grade held in the ORC; however, officers with wartime experience, who have satisfactorily performed duties of a higher grade, may be promoted to fill T/O vacancies in such units. Graduates of ROTC and Officers' Candidate School will form a source of subsequent procurement as well as officers who served honorably in the armed services.

Initial assignments of enlisted men will be made from volunteers who are veterans and have served honorably in the armed services in the present war. Other sources of enlistment will be the men being discharged from the armed services, and from the voluntary enlistments in the ORC.

Officers and enlisted men who are not assigned to ORC units will constitute a reservoir of strength needed for the expansion of the Army of the United States, and as replacements for all components. All enlisted men will be considered in the Active Reserve, and Officers who meet the standard prescribed by the War Department will be classed as Active Reserve. Officers who fail to meet these standards will be placed on Inactive Reserve.

Training objectives will be accomplished through: (1) Active Duty. (2) Attendance at Service Schools. (3) Inactive duty training. (4) Army Extension Courses.

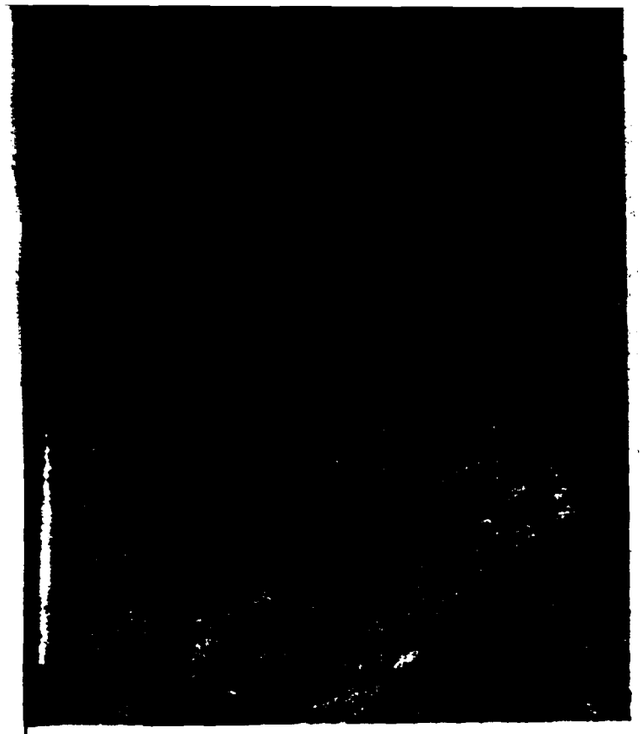
Every opportunity will be provided for enlisted men and officers to advance and earn promotion. An opportunity will be provided for both enlisted men and officers to progress through the entire system of military schooling. Reserve Officers will be offered the opportunity to attend the same courses as officers of the Regular Army. Selected enlisted men will be detailed to officers' candidate schools and become eligible for appointment as second lieutenants. The grades and ratings for enlisted men assigned to units will be the same as those prescribed for Regular Army.

Instructors will be assigned to the Organized Reserve Corps in a sufficient number to efficiently supervise the instruction and administration of all units. Warrant Officers or enlisted instructors will be assigned to assist commissioned instructors on the basis of one or more for each commissioned instructor.

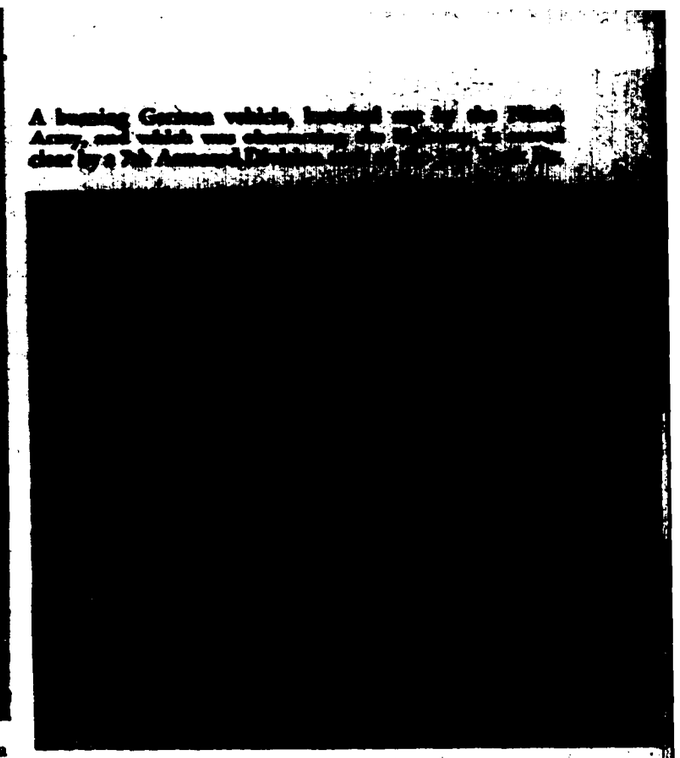
The provision for fully manned and equipped Reserve Units probably is the most progressive step yet taken for training members of the Reserve Component. In addition to the training value of uninterrupted contact between enlisted men and officers in perfecting themselves and their unit for emergency service, the *esprit de corps* developed by membership in a flesh and blood unit rather than one which exists only on paper is inestimable.

Although it is realized that the information presented here is scant, it is all that is available at the present time.

As plans progress and new information becomes available it will be disseminated to the field.



A 5th Armored Division tank, U. S. Ninth Army, passes a dead Nazi as it drives through Germany on April 2, 1945.

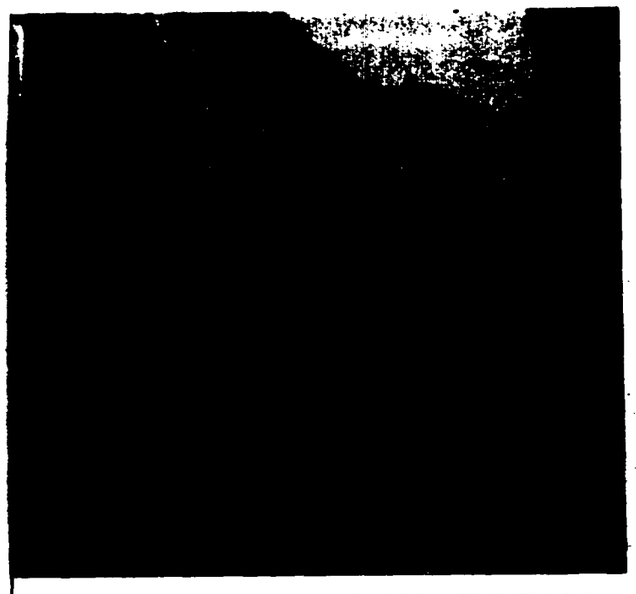


A burning German vehicle, bombed out by the Ninth Army, and which was abandoned by the Nazis, lies close by a 7th Armored Division tank.

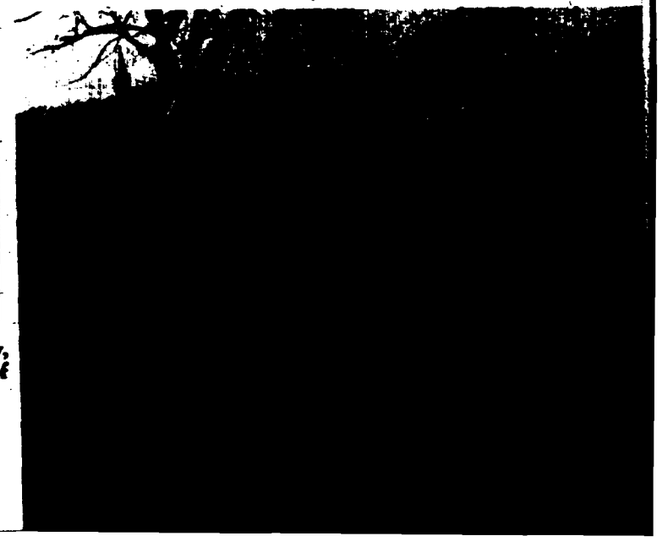
U. S. ARMORED DIVISIONS IN WORLD WAR II

(To be continued)

Signal Corps Photos



A tank of the 6th Armored Division, U. S. Third Army, followed by infantrymen, advances through the town of Oberdorls, Germany, which this division captured.



Tankdozers of the 8th Armored Division, U. S. Ninth Army, are shown being driven over tank traps in Germany.

THE NRA BOOK OF SMALL ARMS. Vol. I, Pistols and Revolvers. By W. H. B. Smith. Military Service. $10.00.

There has long been a vital need felt for a comprehensive book on small arms which gave more than a meager coverage of technical data. Under the auspices of the National Rifle Association and the Military Service Publishing Company, the author of *Basic Manual of Military Small Arms*, has met this need with regard to pistols and revolvers in the first volume of *NRA Book of Small Arms*. Subsequent volumes to be published about a year apart, will cover Rifles and Shotguns, Submachine Guns and Machine Guns, and Ballistics.

The first section of Volume I gives an analysis of the functional development of hand weapons. The second and largest section, handled by calibers and arranged alphabetically by manufacturers names, includes exhaustive technical and ballistic data as well as complete operational details of important major weapons. The third section is given over to excellent illustrations and minute details of each minor weapon. A complete glossary gives full and comprehensive explanations of all technical terms used.

No book of this type would be complete without a thorough coverage of ballistic data. Entirely new information on United States revolver and pistol cartridges was compiled by the Western Cartridge Company. The H. P. White Company prepared the material on foreign and obsolescent cartridges.

This is without any question the most exhaustive book in publication on the subject of small arms. Its value to military and sports men cannot be estimated. Undoubtedly it will be a must for any complete library, personal or public.

✓ ✓ ✓

CLOAK AND DAGGER. By Corey Ford and Alastair MacBain. Random House. $2.50.

SUB ROSA. By Stewart Alsop and Thomas Braden. Reynal & Hitchcock. $2.50.

The lurid and fascinating tale of the work of the Office of Strategic Services will probably never be told in its entirety—certainly not for many years. *Cloak and Dagger*, whose authors were connected with OSS, gives a few scattered and exciting stories of the men who went into the far corners of the world bent on propaganda, sabotage, intelligence work, and the organization of underground warfare. Brief and sketchy as these stories are, they rival any mystery or spy story for reader-interest, and at least give an inkling of the kind of a job undertaken by these anonymous men. The complexities of modern warfare are once again emphasized, as well as the versatility demanded of any army if it is to compete successfully with unscrupulous nations.

Unfortunately several incidents, such as the negotiations with General Wolff, are not adapted to summarization and the reader is left somewhat confused by the whole episode. Most of the cases, however, are excitingly handled and suffer only from a want of finer writing, a not too important requisite for this type of factual thriller.

Sub Rosa covers much the same material, and many of the same incidents, contained in *Cloak and Dagger*. Its authors were actually engaged in active "behind the lines" activities, both were with a "Jedburgh" mission, and their accounts are well written and have a most authentic note.

In *Sub Rosa* the authors do not hesitate to acknowledge many obvious weaknesses, and to point out specific faults which undoubtedly could have been corrected to advantage. Both of the books on OSS are interesting reading, but the last named is a superior piece of workmanship and a more constructive analysis.

✓ ✓ ✓

PATTON: THE FIGHTING MAN. By William Bancroft Mellor. Putnam. $3.00.

It is perhaps unfortunate that the author has chosen to call this book *Patton: The Fighting Man* because as a study of this great general's tactics and campaigns it is far from an adequate contribution to our knowledge. However, it is an excellent biography of his earlier years, and the material generously contributed by his immediate family has enabled Mr. Mellor to give an accurate and extremely interesting picture of the youth and young manhood during which a great cavalryman grew into a magnificent general.

That portion of the book dedicated to this war is hurried and unsatisfactory. Someday a great story will be written about North Africa, Sicily and the Battle of the Bulge—but time must amalgamate the factors and the author will have to be a former staff officer, or a very serious student of military affairs.

Mr. Mellor's biography, hurried though it is, is better than might have been expected, and will certainly be of considerable interest to those who are not familiar with the early training and military experiences of George S. Patton, Jr.

✓ ✓ ✓

GENERAL GEORGE CROOK: HIS AUTOBIOGRAPHY. Edited and annotated by Martin F. Schmitt. University of Oklahoma Press. $3.00.

His autobiography covers General Crook's life from his graduation from West Point in 1852 to June 18, 1876. His entire military career with the exception of the four Civil War years, was on the frontier.

While there is little new information added to our knowledge of the Civil War period or the west of the 19th Century, the frank analysis of situations and blunt, occasionally caustic, judgements of men and situations makes interesting reading. Students of this period will find much material in this objective and lively book.

THE STORY OF THE STARS AND STRIPES. By Bud Hutton and Andy Rooney. Farrar & Rinehart. $3.00.

Unique alike in the army and the newspaper profession, *Stars and Stripes* filled one of the most important needs of the soldier in the field—an outlet of self-expression wherein a man saw his gripes, his problems, his fears and sometimes his triumphs expressed as he could not express them himself. Somehow it made him feel better.

The Stars and Stripes of this war varied greatly from its predecessor of World War I although from all evidence it will father as many nationally known newspapermen of a high caliber as did the earlier paper. With a fine balance of humor and acumen, Bud Hutton and Andy Rooney have told the inside story of the eccentric and unmilitary staff and its efforts to honestly report the war.

Racy anecdotes of the staff, whether in their offices in the building of the staid and conservative *London Times*, drinking in the near-by pub, setting up shop in battered buildings on the continent or seeking news in combat, make fascinating reading. Underlying these lively accounts there is a more serious vein concerned with the many problems that faced these incorrigible newspapermen.

The book is extremely entertaining, and its reception by reviewers of such papers as the *New York Times* and the *New York Herald Tribune* is both interesting and significant.

✓ ✓ ✓

FROM OMAHA TO OKINAWA. By William Bradford Huie. E. P. Dutton Co. $2.75.

Mr. Huie has already written *Can Do!*, and *Seabee Roads to Victory* to give the public an idea of what this amazing branch of the service contributes to total war. In this latest book he describes the work of the Seabees in the landings on the Normandy coast, Iwo Jima, Tinian, Saipan, Guam, the Philippines and Okinawa. Excellent photographs show the Seabees at work.

The tremendous job of building airfields, roads and other engineering projects was magnificently performed by these technical men, frequently too old for the regular army and navy. Unfortunately, too much space is given to names and individual addresses, robbing the book of much of the power it might have attained at the hands of a more objective writer.

✓ ✓ ✓

HOW TO BE A CIVILIAN. By Morton Thompson. Doubleday, Doran. $2.00.

The author of the zany *Joe the Wounded Tennis Player* has written an amusing handbook illustrated by Charles Pearson of *Yank* for the returning veteran. Much sound advice is interspersed with humorous instructions and comments. How to Buy Civilian Clothes, The Job Deal, Organizations, TS and Hitting the Book are some of the chapter headings and much worthwhile advice will be found under them.

The language is that of the veteran, and may confuse the layman, but *How To Be A Civilian* will prove amusing to all readers.

PATTON:

The Fighting Man

By

WILLIAM BANCROFT MELLOR

The story of the most colorful general of World War II. A biography that every cavalryman will want to own.

$3.00

WASHINGTON TAPESTRY

By

OLIVE EWING CLAPPER

The Washington scene as viewed through five administrations by the widow of one of the nation's most honored newspapermen.

$2.75

One of the Most Important Stories of World War II

PATTON and HIS THIRD ARMY

By

COLONEL BRENTON G. WALLACE

The biography of an army. The story of one of the most amazing feats of history.

$3.00

BOOKS for the SPORTSMAN

Tranquillity
Tranquillity Revisited
Tranquillity Regained

By

COLONEL HAROLD P. SHELDON

The first two of these volumes was sold out in a limited edition. The Countryman Press has now provided not only these two works, but a third, *Tranquillity Regained*, in three pocket-sized volumes. They will delight any lover of gun, rifle, and hound who enjoys the flight of ducks.

$5.00 the set

Order your copies from The Cavalry Journal

WHILE YOU WERE GONE. Edited by Jack Goodman. Simon and Schuster. $3.50.

Originally planned primarily for the information of the veteran, this brilliant symposium has been developed into a popular history which will interest the intelligent civilian as well as the men who have been out of touch with happenings in the nation.

Twenty-four phases of the American home front at war are portrayed through the eyes of twenty-six authors (two of the chapters are collaborative). Each contributor is an authority on the subject discussed and the editor has endeavored to maintain a middle of the course balance in his selection of authors. While this policy has not resulted in an impartial study, it has produced a variety of weighed opinions, sometimes at variance and occasionally controversial. Any reader will inevitably take issue with some viewpoints and agree with others; but everyone will find interest and amusement in the quizzical and clever descriptions of the civilian front, and much valuable information in the serious analyses of important occurrences.

MOM, I'M HOME! By Hoff. Doubleday, Doran. $2.00.
THE WOLF. By Leonard Sansone. Crown. $1.00.

The author of *Mom, I'm Home!* says, "The author is bitterly ungrateful to World War II for the ideas in this book." This lack of gratitude will be understood but not concurred in by the reader of Syd Hoff's sensitively humorous depiction of the confusing incidents of a returning soldier.

The Wolf needs no introduction. His career is continuing with its usual success.

REVEILLE FOR RADICALS. By Saul D. Alinsky. Chicago University Press. $2.50.

The title of this book is both daring and unfortunate. It may repel many readers and that would be a most unfortunate circumstance. Mr. Alinsky describes a "liberal" as one who dreams dreams, a "radical" as one who builds the world of men's dreams. He brings out the indisputable historical fact that the men we most revere in this country were radicals, Thomas Jefferson, Thomas Paine, Benjamin Franklin, Patrick Henry, and a score of others.

A particularly significant chapter for present-day readers points out the similarity between big business and labor organizations. The attitude is clear visioned, and the phraseology unequivocal.

The building of People's Organizations in various communities with an aim to accomplish collectively what cannot be done singly is interesting and encouraging. The methods of organization are described and the plan of activity outlined.

Any reader interested in national affairs will find much instructive material in these pages and the "radical" concerned with a desire to do something more than commiserate with the poor, the uneducated, and the otherwise handicapped, will find a definite stimulus and direction.

THE BALANCE OF TOMORROW. By Robert Strausz-Hupé. Putnam. $3.50.

The author of *Geopolitics* has turned his attention to the bases from which world power is derived, with particular attention to the potential assets of the United States. He takes into consideration the problems of population, agricultural resources, industrial possibilities and natural resources. He measures our assets and analyzes our trends, not overlooking the importance of the less tangible, but equally important, spiritual forces, and their influence on our foreign policy.

One passage of particular significance at this time bears quoting here:

"American power will be dependent upon the military force available at any given moment. The dangers of the future can no longer be met by the improvisation of a large fighting establishment. A minimum of strength will have to be available at any time, not only on paper, but so equipped that it can intervene on distant battlefields at short notice. Never again will the United States have three or four years to arm in wartime while the enemy is being kept at a safe distance from the centers of America's power."

TROUBLE ZONE. By Leon Dennen. Ziff-Davis. $1.50.

In 1944 the author of this little book left New York for Istanbul, Turkey, on a rescue mission for an unnamed American relief agency. After nine months in the Balkans and the Middle East he saw the spiritual and political situation in that area as a vast conflict between England and Russia.

The political situations in this particular portion of Europe have always been confusing and frequently fraught with dynamite. Any country involved in its many-faceted problems will inevitably be criticized by observers, particularly Americans who are not as a rule too well versed in middle European political and social aspects. Whether or not Mr. Dennen's condemnations and appraisals of British and Russian actions are correct is a matter of conjecture. Much information that he gives is of considerable interest and his conclusions that only a democratic federation based on cooperation will bring peace to these small countries are in line with most constructive thinkers.

WAR YEARS WITH JEB STUART. By Lt. Colonel W. W. Blackford, C.S.A. Scribners. $3.00.

It is not known just when Colonel Blackford wrote down his recollections of his associations with General Stuart, but it is clear that time enough had elapsed for the war years to have become glamorized and for memory and subsequent information to have become somewhat mixed. The author is not objective, and it would be an anachronism if he were. He has recounted his experiences under the most glamorous general of the Civil War; military engagements are described but people, personalities, and entertainments are not forgotten. The charm of this interesting and nostalgic record is that of Thomas Nelson Page and is better read as a delightful, if somewhat fanciful, picture of an era rather than as a military history.

Have You Read - -

***The White Tower*, by James R. Ullman**

The story of an American, an Englishman, a Frenchman and a German who climb the Alps with an Austrian girl and a Swiss guide.

$3.00

***Arch of Triumph*, by Erich Maria Remarque**

The author of *All Quiet on the Western Front* depicts the life of a refugee physician in Paris just prior to the war.

$3.00

***Brideshead Revisited*, by Evelyn Waugh**

A brilliant satirist views the post-World-War-I generation in the throes of religious fanaticism.

$3.50

***The Practical Cogitator*, by Charles P. Curtis, Jr. and Ferris Greenslet**

The other name for this fascinating book is "The Thinker's Anthology." It is a selection of long and short prose and verse from many languages and a wide range of authors from Confucius to James Cozzens, the Old Testament to Gertrude Stein and James Joyce.

$3.00

The Story of the STARS and STRIPES

By

BUD HUTTON and ANDY ROONEY

The hilariously written story of the bitter struggles and hard-earned triumphs of the *Stars and Stripes*—the newspaper that General Eisenhower and the staff felt should be the soldiers' paper.

$3.00

WHILE YOU WERE GONE

Edited by JACK GOODMAN

There's *something* about it you'll like! *Wolcott Gibbs* covers four years of theater, *Dan Parker* tells about sports, *Norman Corwin* writes of radio, *James Thurber* tells what animals did, *Paul Gallico* tells what people did.

What happened in the world of newspapers, magazines, advertising, movies, science, labor, industry, agriculture, the Presidency, Congress and the war agencies, during four years of war is all told here.

$3.50

SOLDIERS OF GOD. By Christopher Cross in collaboration with Major General W. R. Arnold. Dutton. $2.75.

The Chaplain Corps has always performed outstanding service in wartime. The story of their work and specific incidents of loyalty, service and bravery, beyond the bounds of sectarianism in a world made one by war give a lesson in unity and tolerance that is needed even more in peace.

DUTY TO LIVE. By Emmett Dedmon. Houghton-Mifflin Co. $2.50.

The author of *Duty to Live* flew combat missions against France, participated in the North African invasion, and returned to fly missions against targets in Norway and Germany. For six months he served as navigation staff officer at Eighth Bomber Command. His plane was set afire over Hanover, Germany on July 26, 1943 and while he parachuted to safety it was behind the German lines and he was held as a prisoner for almost two years. During this period he wrote and rewrote the story of a bomber crew.

The characters in this novel were stationed in England, and represent a variety of American backgrounds and education. Flash-backs tell the story of each of the men one, the son of a famous surgeon; an Italian-American who joined up because his brother was killed in a Jap prison camp; a soldier who was seeking to shed responsibility and secure enough money to pay for his cheap pleasures; a Mexican caddy who sought the realization of a democracy which had never existed in the town of his birth; there is the bombardier who was still hoping to be a pilot; another to whom the war came as a disruption of a well ordered life; and the navigator, who saw something to paint in every scene.

Unfortunately Mr. Dedmon puts almost too much technical detail into his otherwise penetrative novel. This tendency, the result of a thorough knowledge of his subject, makes the early part of the book a little dry but after the first few chapters he moves into a smooth and interesting story of the welding of a heterogeneus group into an integral whole.

LIGHT HORSES. By Cecil F. Rooks. Ziff-Davis Co. $2.00.

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Tanks pictured are, left to right, M24 light, M4 A3 E8 medium, and M26 heavy

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A CAVALRY GROUP WITH AN ARMORED DIVISION

by Captain Alan R. Probst

Abridged from the official, after-action reports of the 101st Cavalry Group (Mecz).

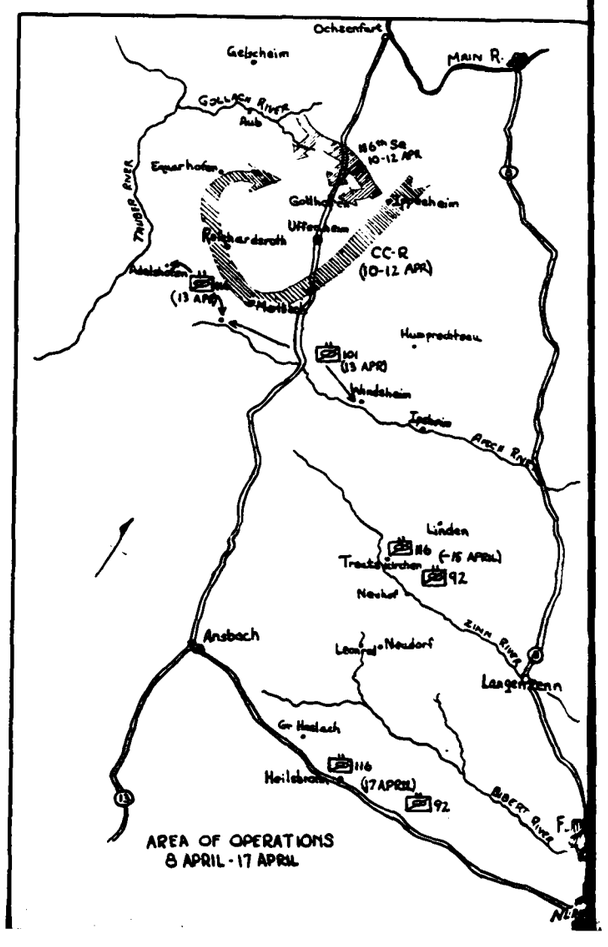
IN an area offering adequate road nets, a cavalry group and an armored division can operate together over a relatively wide front to mutual advantage. So long as sufficient road space is available, the group can operate along the flanks and to the front of the division, developing the contour of enemy centers of resistance, providing security, mopping up between the prongs of the combat commands. In such a situation, the group is given the opportunity to utilize to the utmost its characteristic mobility. Provided with a suitable attachment of other arms it becomes an additional task force, extending the area of operations of the division.

This article describes the operations of the 101st Cavalry Group (Mecz), Colonel Charles B. McClelland commanding, while attached to the 12th Armored Division, commanded by Major General Roderick R. Allen. In abridging the official report, three typical periods of operation have been covered in some detail. Locations of command posts have been deleted, and certain other data necessary to official reports, such as numbers, dates, and times of Operation Instructions have been eliminated in order to permit concentration on the manner in which operations developed. Because this is an account of Group action, the operations of major subordinate units are described, and little detailed account is given-of the exploits of individual units.

Just prior to attachment of the Group to the 12th Armored Division, both units had been operating on the right flank of the XXI Corps, which was driving across Germany east of the Rhine to seize Wurzburg and the crossings over the Main River to the south of the city. Both units were located south of the southernmost loop of the Main in the open, rolling terrain below Wurzburg. At the time the attachment was made on April 8, the Group was composed of Group Headquarters, the 101st Squadron, with Lieutenant Colonel Milton Kendall, commanding, and the 116th Squadron, with Lieutenant Colonel Hubert C. Leonard commanding. The offensive operations which followed developed into a pursuit of the rapidly crumbling enemy forces which led rapidly south to the passes into the much-touted "National Redoubt" in the Alps.

Initial Mission

The initial mission of the Group was to conduct a reconnaissance in force to the northeast in a zone approximately 30 kilometers in width, to a limiting line on the high ground southeast of the Aisch River. The 92d Cavalry Reconnaissance Squadron (Mecz), integral reconnaissance unit of the 12th Armored Division,



was given a contiguous zone to the left of the Group. The Group was reinforced by the attachment of one company of medium tanks, and the 495th AFA Bn was placed in direct support. The medium tanks were further attached to the squadrons and the Group moved forward, squadrons abreast, with the 101st Squadron on the right. Resistance was very determined. By nightfall the 101st Squadron had reached the Tauber and Gollach rivers in its zone. The 116th Squadron was approximately three kilometers short of the Gollach in its zone.

Both squadrons continued pressure during April 9. Enemy resistance was well defined along the Gollach River. As a result of the information gained, the Division launched two combat commands in simultaneous encircling movements, CC-R attacking south and southwest in the Group zone, and CC-B in a similar maneuver in the zone of the 92d Squadron. The 101st Squadron was assembled prepared to follow CC-R through the gap created and continue the reconnaissance mission to the limiting line as the Combat Command turned west and northwest in its encircling move.

Counterattacks at two points in the 116th Squadron zone were beaten off during the night of April 9-10. The CCs jumped off in the morning, and CC-R advanced approximately three kilometers in heavy fighting during the day. The attack was renewed the next morning, the Combat Command still moving forward slowly as the enemy defended stubbornly from every vantage point. The 116th Squadron maintained pressure against the enemy confronting it but made no appreciable gains. In the afternoon a task force of Troop C, 116th Squadron, one platoon of medium tanks, one platoon each of light tanks and assault guns, attacked from the northwest to clear Gollhofen, a strongly held town which was blocking the principal north-south road through the Group zone. Another task force—composed of Company F, 101st Squadron, one platoon of Troop B, one platoon of medium tanks, and two platoons of Troop E, 101st Squadron—attacked from the northeast. The forces succeeded in fighting their way into the town in the late afternoon, but were unable to hold their positions and pulled back before dark.

During the night the enemy made a tank attack against the Command Post of the 101st Squadron. It was beaten off without serious losses. At dawn the CP area was strafed and bombed by enemy jet-propelled planes. CC-R continued its attack and broke the core of enemy resistance confronting it. The Combat Command moved rapidly south, with the 101st Squadron covering its left flank until it turned west and northwest in the encircling move. The Squadron continued east on the reconnaissance mission against continued resistance. By nightfall the Squadron had reached a line roughly three kilometers from the west banks of the Aisch River.

In continued pressure throughout the day, the 116th Squadron reached the Gollach River line in its zone. At 1530 liaison was effected with elements of CC-R, and the two units continued pressure on the forces pocketed. The eastern end of the pocket could not be closed, however, and OPs reported considerable movement of enemy vehicles in that direction. During the night, artillery fire was laid down with good effect.

Early April 13 both squadrons again moved forward, the 116th Squadron moving rapidly south and east until strong opposition developed along the Aisch River and progress was halted. The 101st Squadron continued in its zone against heavy resistance. The Squadron command element and reserve were attacked in force about midday by infantry, self-propelled guns, and tanks. The attack was beaten off and heavy casualties were suffered by the enemy infantry. One Mark IV tank and four self-propelled guns were destroyed. By nightfall the Squadron had reached the Aisch River in its zone.

In the course of this operation, the Group reconnoitered a zone approximately 30 kilometers in width to a depth of 25 kilometers in the face of determined enemy resistance, outlined the enemy's MLR along the Aisch River, inflicted heavy casualties in both men and matériel and captured 384 prisoners. Late April 13 the 101st Squadron was attached to the 4th Infantry Division, effective April 14, and remained with that unit until April 19.

The Turn to the South

In the next series of operations, the direction of effort swung more to the south, as corps and army boundaries were affected by the operations of other units coming down from the north. On April 14 all Division units were alerted to exploit on three hours notice in a zone roughly 30 kilometers in width. Bounded on the northeast and southwest by Highways 8 and 13 respectively, the zone by-passed Nurnberg to the southwest to an objective line roughly 30 kilometers south and southwest of that city. The Division was to move in two columns with axes along the highways at the flanks of the zone. The Group was reinforced by attachment of the 92d Squadron (less two troops), the 342d AFA Battalion, and two platoons of medium tanks, and was directed to move in the zone between the axes of the combat commands to the objective line. Upon reaching the line, the Group was to be prepared to continue the attack to the southeast, or to attack to the north or south on Division order. All elements were directed to report their arrival on Division Phase Line No. 1, the Ansbach-Nurnberg road.

Again the Group disposition was squadrons abreast, with the 116th on the right and the 92d Squadron on the left. The main effort of both Squadrons was directed toward the center of the Group zone. The 116th Squadron displaced east to reach its new zone. The Aisch River was reached without incident. All bridges having been destroyed, the Squadron located a ford and expedited repair of a bridge. Once across the river, reconnaissance was pushed forward to the high wooded ground southeast of the river, where determined resistance was met. As there was no suitable crossing in

the zone of the 92d Squadron, Troops A and D crossed in the zone of the 116th Squadron, and also advanced to the high ground. The enemy counterattacked during the crossing. One of his tanks was destroyed and two damaged, and the attack was repelled.

Early April 15 both Squadrons resumed the attack. At about 1300 the 92d Squadron pushed through in its zone and by nightfall had advanced to the Zinn River. The 116th Squadron was unable to overcome the enemy in its zone, and at 1700 disengaged and passed through the gap opened by the 92d Squadron. The 116th Squadron then moved southeast against light resistance, and by nightfall had reached the Zinn River in zone.

On April 16 the 116th Squadron, unable to find a crossing in its zone, cleared a bridgehead and covered the construction of a treadway bridge at Trautskirchen. The Squadron crossed in the afternoon, seized two towns south of the river, and knocked out several defended roadblocks. At dusk an enemy column marching toward Neudorf, the last town taken, was surprised and dispersed with heavy casualties by artillery and small-arms fire.

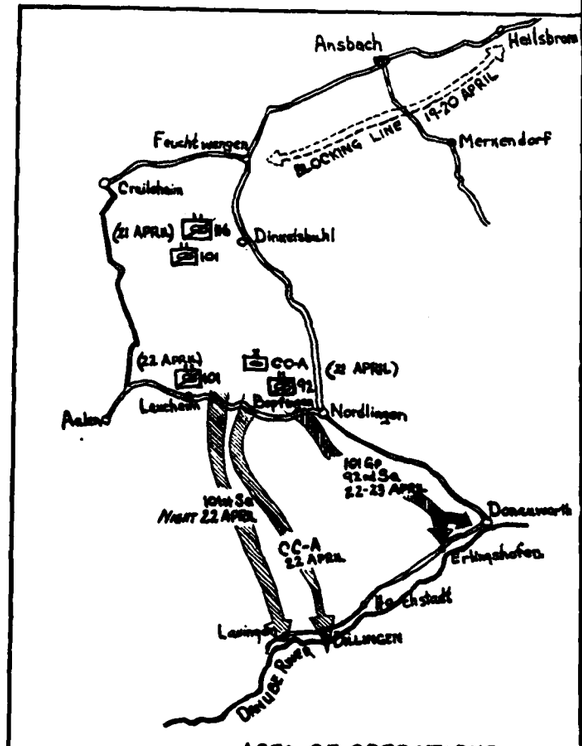
The 92d Squadron in its area at Neuhof found a bridge which had been prepared for demolition, and was blocked by fallen trees and strongly defended, but was still intact. After an all-day battle, the bridge was seized and the demolitions and trees were cleared. The Squadron crossed in force at 1800, seized and cleared the town, and outposted it for the night.

During April 17 both Squadrons advanced against disintegrating resistance. Over the Bibert River, undefended crossings were found that were close to crossings that were hotly defended. By nightfall both squadrons had reached and outposted the Ansbach-Nurnberg highway in zone. During the four days' operations, the Group had advanced 43 kilometers in covering the zone between the two columns of the Division. In addition to casualties inflicted on the enemy, 332 prisoners were captured.

On April 18 the direction of the Division attack was turned southwest along the axis Ansbach-Feuchtwangen-Crailsheim. CC-B was directed to seize Feuchtwangen, CC-A to follow and secure Ansbach. The Group was directed to move south and west by all available routes, and to protect the left flank of CC-B, and assist in the attack on Feuchtwangen. Squadron axes were prescribed so that the Group would be brought southwest to an objective line extending south four to eight kilometers from Feuchtwangen. The Group met resistance almost immediately upon moving out. Both Squadrons pushed south and west against a series of delaying actions. At 2000, Troop C, 92d Squadron, reached the main north-south highway south of Ansbach and surprised an enemy column en route toward Ansbach. Artillery and assault gun fire were placed immediately and with good effect, and the troop consolidated its position along the highway.

Troop C, 116th Squadron, one platoon each of Company F and Troop E attached reached Merkendorf, farther south along the same highway, and fought its way into the town. Elements of both 17th SS Panzer Grenadier Division and the SS Totenkopf Division were driven from the town, and they assumed new defensive positions approximately one kilometer east and southeast of the town. At about 0430, April 19, the SS troops counterattacked, striking simultaneously from the east, south, and northeast. After a two-hour series of hand-to-hand engagements, the fanatic assaults of the attackers were repulsed. The troop reorganized at daylight in time to break up an attempt to reinforce the enemy still in the town. Eighty of the SS troopers who participated in the initial attack were killed, 16 captured, and an undetermined number wounded. The troop and attached units suffered casualties of two killed, 10 wounded, and seven missing, and several vehicles destroyed. Of the seven missing, two later escaped their captors and returned to their unit.

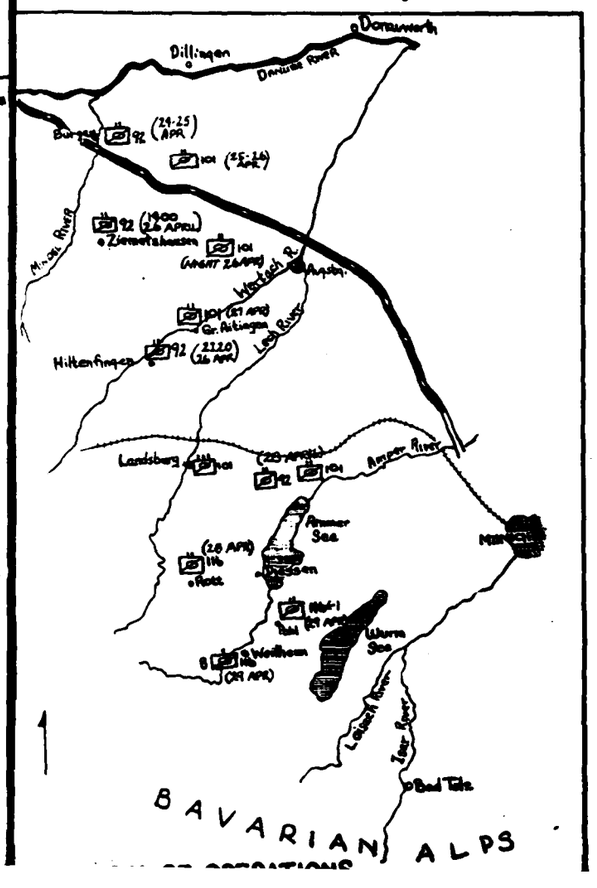
During the night of April 18-19, instructions were received that XV Corps had been given responsibility for Nurnberg. The direction of the Division attack was turned south at Feuchtwangen and the new Division axis was to pass through Lauchheim on the Aalen-Nordlingen highway. The Group was directed to block along a 50-kilometer line extending from near Feuchtwangen east and north to Heilsbronn on the Ansbach-Nurnberg highway, and to maintain contact between the 12th Armored Division and the 42d Infantry Division, of the XV Corps.



AREA OF OPERATIONS
18 APRIL-23 APRIL

The 101st Squadron was relieved from attachment to the 4th Infantry Division and returned to the Group at 1400, April 19. During April 19 the three squadrons moved into assigned positions in the protective screen, while the Division turned in its new direction. On April 20, the Group was relieved of its blocking mission, and directed to reconnoiter to the south in the Division zone. Initially, the 101st Squadron covered the entire zone until the 92d Squadron could move south and west from its blocking positions. The 116th Squadron was held in Group reserve. A further modification of Division plans on April 20 sent CC-A to the south in two columns. The 92d Squadron was directed to operate in the area between the columns. Progress was fairly rapid during the day, but slowed in the afternoon as resistance became more determined. By nightfall CC-A and the 92d Squadron were approximately three kilometers short of the objective line along the Aalen-Nordlingen highway.

The 101st Squadron, operating in the area between the westernmost column of CC-A and the Division's west boundary, found progress more difficult. At nightfall it was in position west of Dinkelsbuhl and was maintaining contact with enemy forces in the wooded areas to the south. The 116th Squadron was assembled in the 101st Squadron area.



Late April 23, orders were issued for the seizure of crossings over the Danube River between Donauworth and Gundelfingen. CC-A was to continue to the south and seize crossings in the Dillingen area. CC-B, after assisting the 92d Squadron to clear the enemy confronting it, was to seize crossings in the Hockstadt area. CC-R was given the mission of blocking to the east on the Aalen-Nordlingen highway. The Group was directed to send one squadron south along the Division left flank and to seize crossings in the Tapfheim-Erlingshofen area. The other squadrons were to mop up resistance in the wake of the CCs and the advance squadron.

The 92d Squadron was designated to seize the crossings over the Danube; the 101st, to move south and clean up enemy resistance along the Aalen-Nordlingen highway in the western portion of the Division zone; the 116th, to mop up resistance remaining in the area by-passed by the 101st Squadron.

The 92d Squadron moved south early April 22 against very strong resistance. By nightfall the Squadron had reached the Eger River in zone but was prevented from crossing by fierce resistance from the south bank. The 116th Squadron cleared the enemy in its area and again assembled in reserve. The 101st Squadron, assisted by CC-R, cleared up its area. CC-A thrust through the hill masses to Dillingen and seized the bridge over the Danube intact, and established a limited bridgehead on the south bank. At dark April 22, the 101st Squadron was directed by the CO, 101st Group, to move south immediately and seize Danube River crossings in the Lauingen area west of Dillingen. After a bold, night march the Squadron seized and occupied Lauingen by 2330. The enemy, however, had destroyed all bridges over the Danube before they could be taken.

While CC-A and the 101st Squadron consolidated in their areas April 23, the 92d Squadron crossed the Eger River and proceeded south. The enemy resisted strongly at the entrances to the Danube River plain. Artillery fire was placed on the retreating enemy columns with good effect, and after prolonged fighting, the 92d Squadron reached the river area—but the enemy had been able to blow all bridges before they could be seized. CC-B reached Hockstadt, but likewise was unable to seize bridges before they were destroyed. The Dillingen bridge remained the only intact crossing in the Division area.

South of the Danube

During the period April 23-25 operations were concerned with protection of the flanks of the Division, and the extension of the bridgehead area. The 92d Squadron crossed to the south bank and reconnoitered to the south and southwest, and seized bridges over the Mindel River at Burgau and on the autobahn south of Burgau, which facilitated the movement of CC-B along the south bank of the river. Considerable enemy activity was observed on the wooded heights west of Burgau.

The 42d Infantry Division reached the Danube on

the Division's left and took Donauworth. The 63d Infantry Division reached and crossed the Danube on the Division's right. During the night April 25-26, the enemy counterattacked the 63d Division bridgehead in force. The 92d Squadron held its bridges throughout the night, and fought off a sharp counterattack at Burgau the next day. The other squadrons of the Group, and Group Headquarters, crossed and assembled on the south bank. The Group was directed to extend reconnaissance to the south.

While constantly probing at the enemy positions in its area the 92d Squadron found a gap in the defenses on the east bank of the Mindel River. Routes farther east were held in force, and the enemy on the west bank of the Mindel in the vicinity of Burgau were sticking firmly to their positions. The 116th Squadron relieved the 92d at the Mindel River bridges, and the 92d raced south along the east bank of the Mindel for about 15 kilometers and then turned east behind the enemy MLR, and assembled at Ziemetshausen. At 1400 a combat patrol from the 92d Squadron, operating east of Ziemetshausen, intercepted a German officer courier from the 13th SS Corps. Among the top secret documents captured was a marked map showing enemy operations for April 26. The map showed that three divisions had been committed to the attack of the 63d Division bridgehead, and that a fourth division was defending in the Group zone. The Mindel River was marked as the boundary between adjacent Corps. Confusion as to responsibility for the defense of that corridor had apparently resulted in the gap found by the 92d Squadron. (The map and other documents captured were promptly forwarded to 12th Armored Division headquarters.)

In exploit of its success, the 92d Squadron was directed to continue south and seize crossings over the Wertach River at Hiltenfingen and Siebnach. Overcoming strong rear area defenses, the Squadron raced to the Wertach and took intact the bridge near Hiltenfingen at 2000. By 2120 the town and two additional bridges over smaller streams were secured.

The 101st Squadron, moving south in its zone to the left of the 92d, battled its way through wooded areas, finding enemy resistance extremely determined. The Squadron crossed the Augsberg-Ulm autobahn and continued its advance throughout the night, having been directed to seize bridges in the area of Gross Aitingen on the Wertach River. The 116th Squadron mopped up resistance in the area between the Mindel valley and the 101st Squadron zone, and captured a large quantity of airplanes, and an underground airplane parts factory. The Squadron then moved south during the night to assist the 92d Squadron at the bridgehead over the Wertach. CC-A also moved south that night to relieve elements of the Group at the bridgehead. Just before daylight April 27, CC-A arrived at the Wertach. The Group was directed to proceed south with all available troops and seize crossings over the Lech River. The CO of the 101st Group assigned the bridges in the vicinity of Landsberg to the 92d Squadron, and those in the vicinity of Schwabstadl to the 116th Squadron. All bridges over the Lech in zone were found to have been destroyed, and both squadrons made a detailed reconnaissance of the west bank and recommended the repair of bridges and of sites suitable for the construction of new bridges. Meanwhile, the 101st Squadron continued to move south and at midday seized intact the Wertach River bridge at Gross Aitingen.

The Division then was given the mission of continuing southeast to seize and hold Weilheim and Bad Tolz, and deny the enemy the use of passes into the Bavarian Alps in that area. Large enemy concentrations had been reported in Munich and vicinity. The plan directed CC-A—preceded by a squadron of cavalry—to block the passes south of Weilheim and Pennsberg; CC-B to block the passes south of Bad Tolz. The remainder of the Group was to advance to the east and southeast, block exits from Munich in that direction, and protect the Division left flank. The 116th Squadron was assigned to the mission with CC-A, and the blocking line was divided between the 92d and 101st Squadrons.

A partially destroyed railroad bridge near Landsberg was repaired during the night of April 27-28 by Division engineers. The 116th Squadron began crossing at 0600 April 28, against scattered small-arms fire and unobserved artillery fire. The Squadron made good progress through Landsberg, and to a point about 20 kilometers southeast (approximately halfway to Weilheim) where stiff opposition was encountered. Attempts to bypass were unsuccessful and forward movement was halted at dark. During the night, elements of the squadron moved east by secondary roads to the vicinity of the Ammer See.

Followed by the 92d Squadron, the 101st Squadron crossed the bridge after the 116th, and moved east on its mission. Poor roads and demolitions forced the Squadron to detour to the south and return north along the west bank of the Ammer See, with the intention of securing and using the causeway across the northern tip of the See. Progress was delayed by an enemy attack in which were employed four Tiger Tanks and a substantial number of infantry. At dusk, as forward elements of the squadron were approaching the causeway, the enemy detonated prepared charges and literally blew up the road in the faces of the advancing units. The Squadron deployed and outposted the Amper River line for the night. The 92d Squadron did not complete the crossing until late April 28, because of delays in the crossings of the other two Squadrons and the continuous delays for bridge repairs. The crossing finally completed, the Squadron moved east and assembled in support of the 101st Squadron.

Early April 29, Troop A, 116th Squadron, moved around the southern tip of the Ammer See and reached the main highway that joined Diessen and Weilheim. The troop raced east, and from a surprised enemy captured the bridges over the Ammer River. Troop B advanced through the opposition along the original route,

captured the bridge over the Ammer River at the western edge of Weilheim, and at 1100 secured the town. In the meantime, the rest of the Squadron fought against resistance along the alternate route taken by Troop A. CC-A, which had crossed the bridge during the night, began entering Weilheim at 1130.

That afternoon the mission of CC-A and the 116th Squadron was changed: they were to move through the mountain passes south of Weilheim and secure Innsbruck. Since the bulk of the Squadron was being delayed by the fighting north of Weilheim, Troop B, already in Weilheim, was detached from the Squadron and attached to CC-A in order to avoid delay. The force moved out at once and before dark had progressed about 20 kilometers south against varying resistance. The mission was cancelled the following day and Troop B later rejoined the Squadron.

Within the next few days, the operation plans were modified by the changing situation, and by the arrival from the north of other friendly units. Before being relieved from attachment to the 12th Armored Division on May 4 units of the Group conducted an intensive reconnaissance of the water barriers in the area east of Weilheim, and performed patrol and security missions for the Division.

During the course of the long drive south from the Danube, the Group, operating with three squadrons, had found the gap in the defenses south of the Danube and poured south, extending the area of operations of the Division from Dillingen to Landsberg and thence to Weilheim—an advance of roughly 130 kilometers. Several important bridges were seized intact, and were held until they were taken over by the rapidly advancing units of the Division. Security was provided for the Division flanks, enemy supply and communication routes disrupted, and large quantities of matériel captured or destroyed.

During this latter phase in which the attack developed into an extended pursuit, the Group was able to use the mobility inherent in mechanized cavalry to excellent advantage. The rapidity with which the armored units arrived at each vital point allowed the Group to maintain the momentum of its continuous thrust and to keep the enemy off-balance.

To Newly Organizing Armored Divisions and Mechanized Cavalry Unit Associations

Many armored divisions and mechanized cavalry units today are forming associations.

To those who have already formed such associations—and to those who are contemplating the formation of such organizations in the future—THE CAVALRY JOURNAL wishes to offer its services. The facilities of the magazine are open, without charge, to publicize the activities or any other matters which the associations desire to bring to the attention of our readers.

We would be very glad to publish the name of each new association as it is formed, with the address of its headquarters or officials, which, we believe, will help with the establishment of the associations.

Write to THE CAVALRY JOURNAL, 1719 K Street N.W., Washington 6, D. C., if we can be of any assistance.

The 316th Provisional Mechanized Cavalry Brigade in Combat

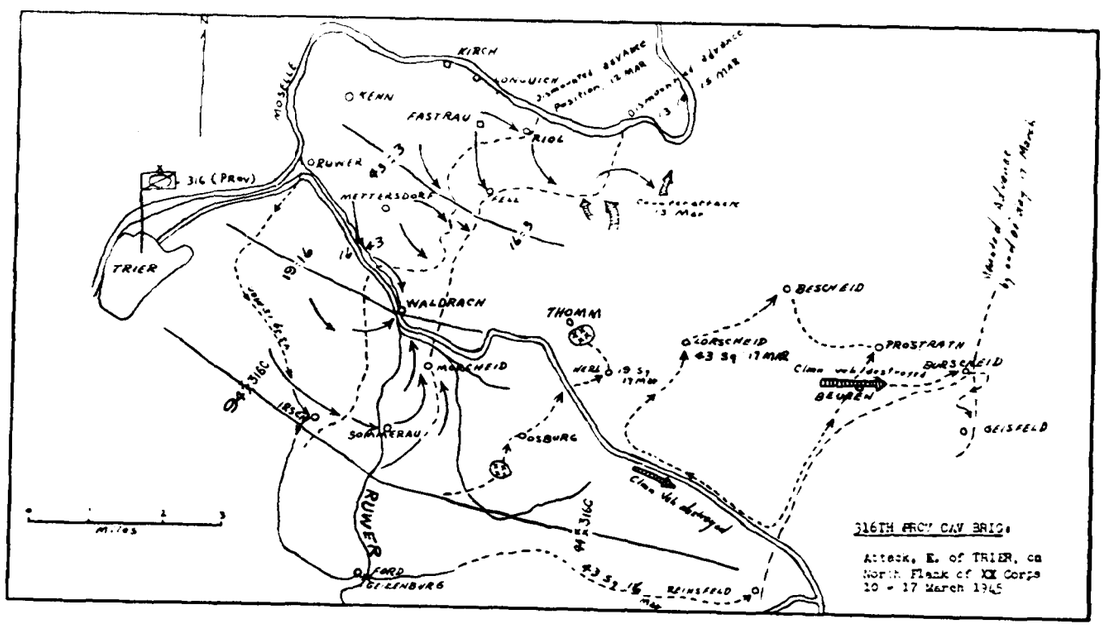
FIRST OF A SERIES

ON March 8, 1945, the 3d Cavalry Group of the XX Corps, composed of the 3d and 43d Cavalry Reconnaissance Squadrons, was in the area south of the Moselle River just east of Trier. It was in the process of taking over the positions held by the 417th Infantry Regiment. For several days it was occupied mainly in securing a suitable line of departure for participating in an offensive operation being prepared by the corps.

In order to assemble the 94th Infantry Division in preparation for this offensive, XX Corps was obliged to leave a wide gap between its left (north) flank and the XII Corps, then north of the Moselle River. Mechanized cavalry was the ideal arm with which to fill the gap and to conduct an offensive in this zone. To augment the mechanized cavalry strength of the corps in preparation for such an operation, therefore, Third Army attached to the XX Corps an additional group, the 16th, composed of the 16th and 19th Cavalry Reconnaissance Squadrons. This group had had no previous combat experience, and so in order to insure coördination of the mechanized cavalry effort, the corps commander decided to form a provisional cavalry brigade for the execution of this mission, and to give it the experienced leadership of Colonel James H. Polk, commanding officer of the 3d Cavalry Group. Accordingly, by corps order of March 9, the 316th Provisional Cavalry Brigade, comprising the 3d and 16th Cavalry Groups, was constituted. Also attached to the brigade were the 241st Field Artillery Battalion, the 245th Engineer Combat Battalion, Company A 818th Tank Destroyer Battalion (SP), and an air support party. The 416th Field Artillery Group was to be in direct support, and the 558th Field Artillery Battalion in general support.

The brigade's mission was to attack in conjunction with the corps, to protect the XX Corps' north flank, and to maintain contact with the 94th Infantry Division on the south. The projected date for the attack was March 13.

Upon its arrival from Veckering on March 12, the 16th Cavalry Group was given the mission of taking over the right of the brigade's sector from the 43d Cavalry Reconnaissance Squadron, and of maintaining contact with the 94th Infantry Division. Accordingly, on the day before the attack, the brigade was disposed with cavalry groups abreast, the 16th Cavalry Group on the right. In each group, squadrons were disposed abreast, so that the brigade front was, in order from right to left: the 16th and 19th cavalry reconnaissance squadrons, from a draw on the south (the north boundary of the zone of action of the 94th Infantry Division), north



to the Ruwer River; and the 43d and 3d cavalry reconnaissance squadrons from the Ruwer River north to the Moselle River. The width of the front was approximately seven miles.

The primarily dismounted phase of the attack began March 13 and continued through March 15. As it progressed, the 43d Cavalry Reconnaissance Squadron was pinched out and passed into brigade reserve; its sector was taken over by the 16th Cavalry Reconnaissance Squadron. When the advance reached the Ruwer River, all bridges were found destroyed. The 94th Infantry Division, however, discovered a ford near Geizburg, and on March 14-15 the 19th Cavalry Reconnaissance Squadron sent tanks across to support its dismounted attack on Sommerau and Morcheid. On March 16-17, when the 94th Infantry Division had taken Reinsfeld, the 43d Cavalry Reconnaissance Squadron was sent mounted across the ford to attack north from that point. By the end of March 17, it had advanced as far north and east as Burtscheid.

The terrain in the brigade's zone of action, in the foothills of the Hunnsbruck Mountains, was found difficult for mechanized cavalry operations. The streams and high, heavily wooded ridges ran generally north and south, perpendicular to the direction of advance. The enemy's defensive and delaying tactics were therefore favored, and he was afforded excellent observation posts for directing artillery fire.

In the attack, the main effort was invariably made with the cavalry reconnaissance troops advancing dismounted, closely supported by the light tanks, tank destroyers and engineers. The light tanks and tank destroyers were brought up in defilade and supported the attack with fire, or stood by for use in the assault. The engineers attached to the cavalry troops were employed to remove road blocks and to clear the minefields. The assault guns were generally employed in battery in close support of the attack; and through the air support party, attacks by light bombers were arranged against enemy-occupied towns prior to their assault by the mechanized cavalry.

In the assault, mechanized cavalrymen, mounted on tanks, were employed in the same manner as tank-infantry teams. When a town or high ground was seized, it was immediately organized for all-round defense. As the roads were opened by the capture of the towns and high ground along their routes, the mechanized cavalry troops sent out rapidly moving mounted teams to cut off and harass the retreating enemy.

On March 18, after the corps offensive had been successful, and the enemy had started a withdrawal along the entire front, the provisional cavalry brigade was dissolved. The 3d Cavalry Group, which had been committed without rest for more than three months, was withdrawn to Trier in SHAEF reserve, and the 16th Cavalry Group assumed full responsibility in the zone.

Thus, over a period of eight days, a mechanized cavalry brigade had fought on a seven-mile front against stiff opposition and over difficult terrain, and had advanced 10 miles while inflicting many enemy casualties. An important road that ran through the zone had been opened, and the way had been cleared for a combat command of the 12th Armored Division to exploit the 94th Infantry Division's attack.

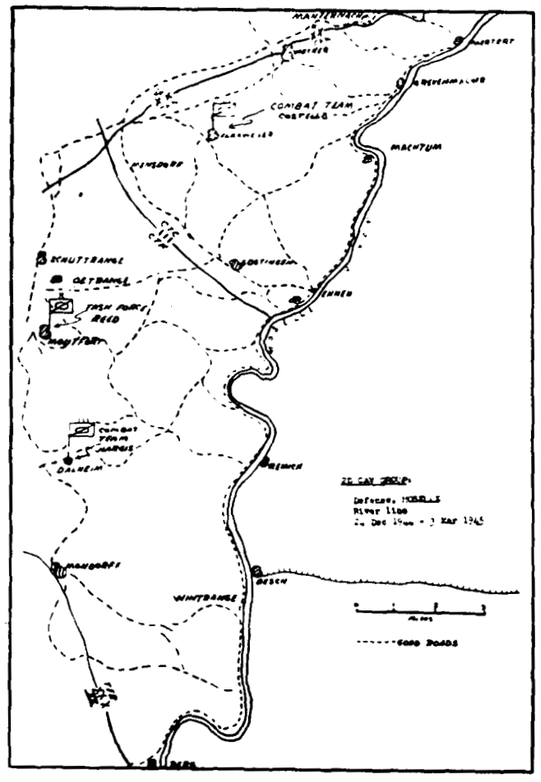
The 2d Cavalry Group

Defense of the west bank of the Moselle River, in the Mountfort Area, Luxembourg, December 24, 1944—March 3, 1945.

ON December 23, 1944, the 2d Cavalry Group received the mission of protecting the right (east) flank of XII Corps along the west bank of the Moselle River in an area from Haute Kontz on the south to Mertert on the north. All enemy pockets on the west bank of the Moselle were to be reduced and the enemy held east of the Moselle within the sector. Contact was to be gained and maintained with XX Corps on the right and with the 4th Infantry Division on the left along a front of 25 miles. In this sector, the Moselle River was from 500 to 600 feet wide and up to 25 feet deep. On the west bank, the hills rose steeply to a height of 450 meters; on the east bank, the slope was gradual. This bank was known to be held by enemy infantry and fortress machine-gun battalions which were generally unaggressive except for patrols. Two enemy bridgeheads existed within the sector on the west bank, one at Machtum and the other at Mertert. There was also an enemy bridgehead at Wasserbillig, two kilometers from the north boundary of the sector.

The corps commander constituted the group as Task Force Reed, and he attached to it the following units: 372d and 398th Engineer (GS) Regiments, 808th Tank Destroyer Battalion (3-inch, towed), 255th Field Artillery Battalion (105mm howitzer), 276th Armored Field Artillery Battalion, and one signal platoon. The engineer regiments were to be used as infantry. For execution of the mission, the task force was disposed as follows (see

sketch): Combat Team Hargis, comprising the 42d Cavalry Reconnaissance Squadron (less Troop E and Company F), one battalion of the 372d Engineer (GS) Regiment, and one tank destroyer company, on the right; Combat Team Costello, comprising the 2d Cavalry Reconnaissance Squadron (less Troop E), 398th Engineer (GS) Regiment, and one tank destroyer company, on the left. The remainder of the force was to be in reserve at Mountfort.



Three defensive lines were organized as follows: an outpost line, held by 11 platoons, on the riverbank; a support line, manned by 18 platoons, along the hills from 1,000 to 2,000 yards west of the river; and a reserve line, not occupied, on the commanding ground two to three miles from the Moselle River. Numerous obstacles were erected, fires were carefully prepared, and an elaborate communications system was established.

Aggressive patrolling into the Mertert and Machtum bridgeheads was initiated immediately and resulted in the withdrawal across the river of the force at Mertert. A dismounted attack that was supported by tanks drove the enemy from the high ground adjacent to Machtum on December 30. On January 11, Troop C of the 2d Cavalry Reconnaissance Squadron attacked dismounted and, after 12 hours of street fighting, cleared the town. Patrolling across the Moselle River was also undertaken, and on February 19, an offensive operation was executed east of the river. Supporting artillery, with the assault gun troops attached, was active day and night. It was possible to rotate organizations frequently, and health and morale remained excellent.

To summarize this operation of the 2d Cavalry Group: a force of some 5,500 successfully defended a front of over 25 miles for more than two months, thus releasing an infantry division for offensive combat; mechanized cavalry, with its mobility and excellent communications, demonstrated its suitability to defend long river lines, with infantry, artillery and engineer support.

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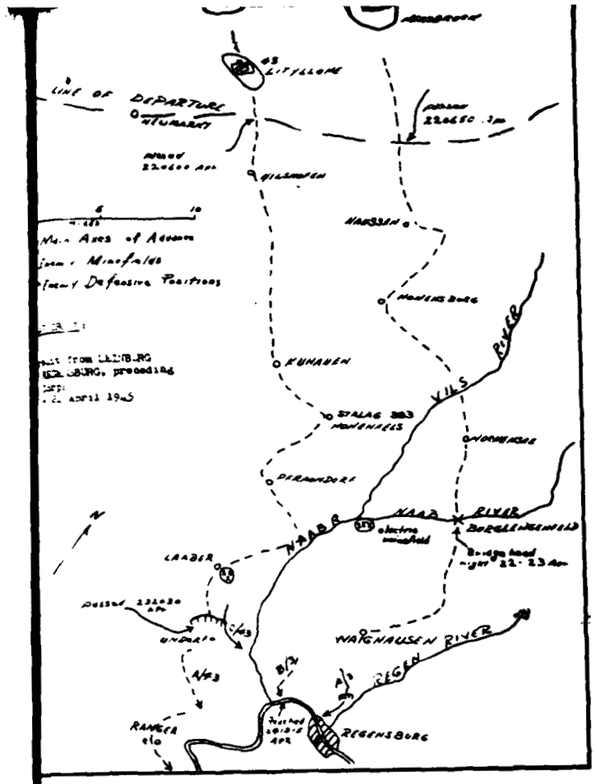
The 3d Cavalry Group

Pursuit from Leinberg to Regensburg, preceding the XX Corps, to seize crossings over the Danube River, April 22-24, 1945.

On April 21, 1945, the 3d Cavalry Group, composed of the 3d and 43d cavalry reconnaissance squadrons, was disposed as shown on the accompanying sketch. The mission then assigned to XX Corps, to which the group was attached, was to begin an advance southeast in assigned zone early on April 22, and to make contact with Soviet Army troops which were reported moving west from Vienna. The 3d Cavalry Group, with Companies A and C, 811th Tank Destroyer Battalion (SP), Company A, 245th Engineer (C) Battalion, and the 5th Ranger Battalion, attached, and with the 274th Armored Field Artillery Battalion in direct support, was given the mission to pursue vigorously the routed German forces southeast to Regensburg, and to seize and hold the bridges across the Danube River in the corps' zone. The group was to be followed by the 65th and 71st Infantry Divisions, advancing abreast, with the 65th on the right.

The group commander decided to move with squadrons abreast, the 43d on the right. The Vils River when



reached was to become the boundary between squadrons. Isolated enemy centers of resistance were to be reported and by-passed, and organized enemy defensive positions were to be developed. The 43d Cavalry Reconnaissance Squadron—with three companies of the 5th Ranger Battalion, Company C 811th Tank Destroyer Battalion (SP), and one platoon of Company A 245th Engineers (C) attached, and with one battery of the 274th Armored Field Artillery Battalion in direct support—was to pursue in its zone, and maintain contact with the 65th Infantry Division, which was to follow. The 3d Cavalry Reconnaissance Squadron, on the left—with the 5th Ranger Battalion (less three companies), Company A 811th Tank Destroyer Battalion (SP), and Company A (less one platoon) 245th Engineer (C) Battalion, attached, and with the 274th Armored Field Artillery Battalion (less one battery) in direct support—was to pursue in its zone and to maintain contact with the 71st Infantry Division, following in its rear, and was to seize and hold all bridges over the Naab River found intact, Group headquarters was to move with the west column.

At 0600 hours April 22, the advance began. The weather was cloudy and cold, and there was rain and snow. The terrain was mountainous and wooded, and the roads muddy and occasionally, although shown on the map, nonexistent. The advance was slowed by road blocks and minefields, a great many of which were defended by small arms and automatic weapons and in some instances were supported by the antitank fire from 20mm and 88mm guns.

The 43d Cavalry Reconnaissance Squadron encountered one organized enemy defensive position, which it developed and penetrated. It also overran a German Stalag and released over 2,000 Allied prisoners of war. The 3d Cavalry Reconnaissance Squadron seized a bridge across the Naab River and held it until the Infantry came up 24 hours later and relieved it. By the afternoon of the third day, both squadrons had reached their objective, the Danube River. Approximately 2,000 POWs had been taken and an unknown number of casualties inflicted on the enemy.

The following were the principal results of this operation: the enemy was routed before he could organize a defensive stand north of the Danube; the seizure of the bridge across the Naab River assisted the advance of the left division; and the operation set the stage for XX Corps' assault on Regensburg.

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The 4th Cavalry Group

Screening the VII Corps' right flank, south of Aachen, September 16–October 2, 1944.

On September 15, 1944, the 4th Cavalry Group, composed of the 4th and 24th cavalry reconnaissance squadrons—with the 759th Light Battalion (less Company A), the 87th Armored Field Artillery Battalion, the 635th Tank Destroyer Battalion (3-inch, towed) and Companies A and C of the 297th Engineer (C) Battalion attached—was given the mission of screening the right (south) flank of the VII Corps in its attack on the Siegfried Line near Aachen.

On September 16, the group, with squadrons abreast, was disposed as follows (see sketch): the 24th Cavalry Reconnaissance Squadron was on the right, with an engineer platoon attached, and one light tank company in direct support; the 4th Cavalry Reconnaissance Squadron was on the left, with an engineer company and a treadway bridge detachment attached; the 87th Armored Field Artillery Battalion was in position just west of Bullingen, in direct support of both squadrons.

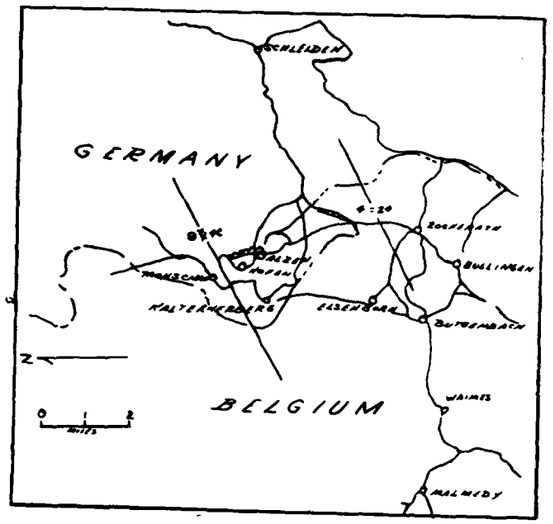
Group headquarters and the remainder of the force were in Butgenbach.

The terrain south of Aachen was hilly and densely wooded. The weather was cold, and there were heavy fogs in the late evening and in the early morning. Because enemy fortifications and the extremely dense woods made vehicular movement impracticable, the group commander directed that both squadrons send out aggressive dismounted patrols to the east.

These patrols on the first day encountered the outer fringes of the Siegfried Line. The defenses consisted of road blocks, sited in depth, and in most cases booby-trapped and covered by small-arms fire. Numerous enemy patrols were working in the surrounding woods. The cavalry patrols were accompanied by elements of the attached engineers which removed the booby traps, and reduced the road blocks after they were captured. One company of light tanks was used to patrol the road between Butgenbach and Kalterherberg.

On September 17, the 4th Cavalry Reconnaissance Squadron repulsed an enemy counterattack by an estimated 100 infantrymen, and on September 18—when the sector was enlarged to a width of 12 to 15 miles to include the towns of Hofen and Alzen—the 24th Cavalry Reconnaissance Squadron also repulsed a counterattack by a company of infantry. Cavalry patrols were successful in locating enemy defensive positions, and through these efforts a valuable file of enemy information was compiled.

The roving tanks played an important rôle in denying enemy patrols entry through the gaps which existed



on the wide front. Furthermore, the deception created through the continued movement of armored vehicles and the interdictory fires laid down by the assault guns, artillery howitzers and tank destroyer guns, created the illusion of greater strength than actually existed. The fact that on October 1 an entire corps (V Corps) began taking over the sector of the 4th Cavalry Group is felt to have been proof of the magnitude of the unit's accomplishment.

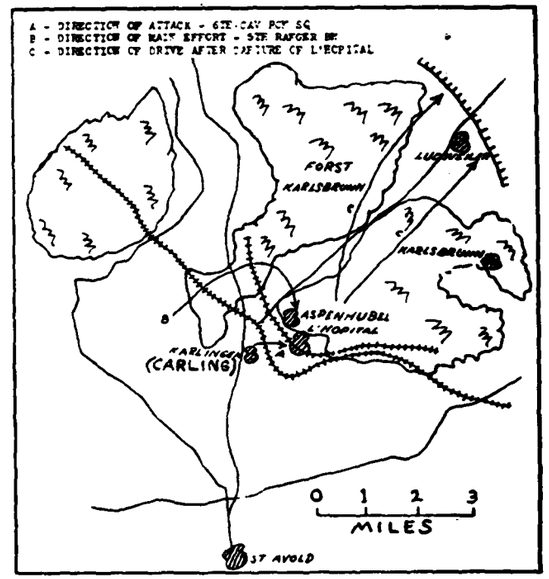
The 6th Cavalry Group

Attack to seize L'Hopital and clear Karlsbrunn Forest, December 2-5, 1944.

ON December 1, 1944, the 6th Cavalry (less 28th Cavalry Reconnaissance Squadron), reinforced by 5th Ranger Battalion, Company C 602d Tank Destroyer Battalion and Company B 293d Engineer (C) Battalion, was attached to XX Corps and given the mission of: protecting the right flank of the corps; breaching the German line of defense at L'Hopital; and clearing the forest of Karlsbrunn to the northeast. The 6th Cavalry Group promptly moved into an assembly area northeast of Saint Avold. The 6th Cavalry Reconnaissance Squadron, with Company D 5th Ranger Battalion attached, relieved one battalion of the 10th Infantry Regiment in Carling and made plans for a frontal assault on L'Hopital, which was separated from Carling by a deep railway cut. Meanwhile, the 5th Ranger Battalion (less Company D), which was to make the main effort on the left, moved into an assembly area northeast of Carling under the cover of woods.

The attack was to begin at 0830 hours December 2, and artillery support was to be provided by the 5th Infantry Division, but because of a lack of time this arrangement had not been completed. Actually, the attack of the ranger battalion, reinforced by light tanks, started at 0900 hours. The tanks, however, could not be used effectively because of the deep mud, and the battalion soon came under heavy artillery and automatic weapons fire. As a result, its attack was temporarily halted after it crossed the railroad track. In the meantime, the 6th Cavalry Reconnaissance Squadron was engaged along the railroad cut between Carling and L'Hopital.

During the night of December 2-3, 1944, the 6th Cavalry Reconnaissance Squadron pushed across the railroad cut and entered the southern edge of L'Hopital, where they came under heavy artillery and mortar fire. After clearing a portion of the town an enemy counterattack inflicted heavy casualties and forced them to withdraw to the railroad embankment. Meanwhile, the



main attack by the 5th Ranger Battalion advanced slowly through the woods to the northeast of L'Hopital. December 4 was spent in advancing the ranger battalion and in making arrangements to receive artillery support from the 19th Field Artillery Battalion, 5th Infantry Division. Early December 5, after a heavy artillery preparation on L'Hopital, the town was captured and cleared by a combined attack of the 6th Cavalry Reconnaissance Squadron and the 5th Ranger Battalion. The cavalry attacked east across the railroad while the rangers drove in from the northeast. The vigor of the attack carried the 6th Cavalry Reconnaissance Squadron through the enemy supports and well into the forest of Karlsbrunn. As a result, enemy artillery was forced to displace and, freed from artillery fire, the 6th Cavalry Group quickly cleared the forest and gained the high ground to the east.

The action was almost entirely dismounted—armored car, tank and destroyer support being difficult due to the heavy mud and the steep approaches to the railway embankment. The attacking forces were initially handicapped by lack of sufficient time for making reconnaissance and for arranging for artillery support. When these difficulties had been overcome, however, the objectives were gained without undue losses, and the attack was strongly pushed. This action illustrates the handicap under which mechanized cavalry forces were placed when operating dismounted without their normal mobile fire support. It also, however, illustrates the ability of mechanized cavalry to overcome that handicap, when reinforced with infantry and aggressively led.

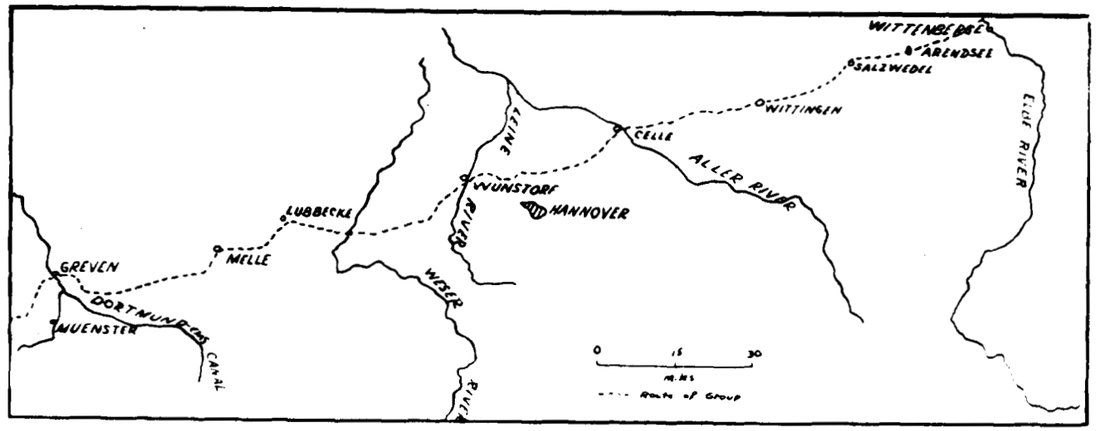
The 11th Cavalry Group

Protection of the north flank of the XIII Corps during the advance from the Rhine to the Elbe rivers, April 2-15, 1945.

ON April 1, 1945, the 11th Cavalry Group, to which was attached the 771st Tank Destroyer Battalion, was assembled near Rorup, about 15 miles west of Muenster, and was attached to XIII Corps, the left corps of Ninth Army. The group was given the mission of protecting the left (north) flank of the XIII Corps from Coesfeld to the east, and of maintaining contact with the Second British Army on the left. This mission was initiated early April 2. In its execution, up to April 15, the 11th Group travelled about 225 miles.

Although the group's mission was one of security, its performance required much offensive combat. The stiffest enemy resistance was met north of Muenster, after the crossing of the Dortmund-Ems Canal, and north of Hannover, at the crossing of the Leine River; but throughout the advance, it was necessary for the 11th Cavalry Group to fight its way into all the towns which lay in its path.

Maintaining contact with the Second British Army was difficult. As far east as Hannover, American and British forces were in close proximity. However, one and then the other was in the lead, and the task became mainly one of coördination; for example, just west of Hannover, a British unit came into a town from the north as the 11th Cavalry Group entered it from the west. Again, just north of Hannover, the route taken by the 11th Cavalry Group was identical with one assigned to a British reconnaissance unit. After Hannover had been passed, however, British elements turned north toward Hamburg, and so a considerable gap was developed which measured from a few to as many as 50 miles. During this period, contact with the British was



maintained through personal visits by the squadron commander and members of his staff, and by an officer-radio liaison team. This liaison was maintained until the group reached the Elbe River.

The 11th Cavalry Group was employed tactically as follows: Squadrons, with a tank destroyer company attached to each, were disposed abreast in sectors facing generally north. Upon group order, the western squadron would move east on a route passing to the south of the eastern squadron, and fight its way to occupy a sector farther east, and this movement was so timed as to insure the arrival of the squadron on its new line in time to protect the north flank of the leading elements of the 84th Infantry Division. (This unit was the left division of XIII Corps, which was advancing east in a zone immediately to the south of the 11th Cavalry Group.) Each squadron habitually employed three task forces or teams, each composed of a cavalry reconnaissance troop, with a platoon of light tanks, a platoon of assault guns and a platoon of tank destroyers attached. The order of march of these teams was alternated during the squadron's advance to its new sector.

This operation illustrated the marked ability of mechanized cavalry to cover open flanks, and to maintain contact with adjacent units in fast-moving action.

A series of articles on the employment of cavalry in combat in the European Theater, of which the above articles are a part, will be continued in forthcoming editions of *The Cavalry Journal*. Remaining articles include:

113th Cavalry Group: Reconnaissance of the XIX Corps' zone of action, L'Escaut Canal to Albert Canal, September 5-8, 1944.

113th Cavalry Group: Defense of the north flank of the 12th Army Group, Sittard area, September 19—November 12, 1944.

2d Cavalry Reconnaissance Squadron: Crossing of the Moselle River and seizure of Wincheringen as a diversion for an attack by the XX Corps, February 19, 1945.

38th Cavalry Reconnaissance Squadron: Defense of the Monschau area against German attack, December 16-17, 1944.

78th Cavalry Reconnaissance Squadron: Attack against Meinkenbracht, April 12, 1945.

86th Cavalry Reconnaissance Squadron: Screening of the 6th Armored Division, near Muehlhausen, April 5-12, 1945.

89th Cavalry Reconnaissance Squadron: Delaying action by Troops A, B, C and E, Befort area, December 16-25, 1944.

92d Cavalry Reconnaissance Squadron: Reconnaissance for the 12th Armored Division, Neustadt area, April 8-16, 1945.

80th Cavalry Reconnaissance Troop: Reconnaissance during advance of the 80th Infantry Division to Kassel, April 1-3, 1945.

104th Cavalry Reconnaissance Troop: Attack from Borgentreich area to Weser River in advance of the 104th Infantry Division, April 7, 1945.

U.S. Cavalry in the ETO

The assignments and attachments of Mechanized Cavalry Groups and of separate Mechanized Cavalry Reconnaissance Squadrons, and the campaigns in which they participated, in the European Theater of Operations.

Group	Mechanized Cavalry Reconnaissance Squadron	Date Received Active Control in ETO As Group	Assignment to Which Assigned	Corps to Which Attached — Campaigns: Normandy	Northern France	Southern France	Ardennes	Rhineland	Central Europe
2d		July 19, 1944	Third	ADSEC	VIII XII		XII XX	XII	XII
	2d		Third	ADSEC	VIII XII		XII XX	XII	XII
	42d		Third	ADSEC	VII XII		XII XX	XII	XII
3d		Aug. 10, 1944	Third		XX		XX	XX	XX
	3d		Third		XX XII		XX	XX	XX
	43d		Third		XX		XX	XX	XX
4th		June 18, 1944	First	VII	VII		VII	VII	VII
	4th		First	VII	VII		VII	VII	VII
	24th		First	VII	VII		VII	VII	VII
6th		Aug. 2, 1944	Third	Army	Army		III	VIII	VIII
	6th		Third	Army	Army		III	VIII	VIII
	28th		Third	Army	Army		III	VIII	VIII
11th		Dec. 14, 1944	Ninth					XIII	XIII
	36th		Ninth					XIII	XIII
	44th		Ninth					XIII	XIII
14th		Dec. 11, 1944	First (until Apr. 18) Third				VIII	XVIII III	III
	18th		First (until Apr. 18) Third				VIII	XVIII III	III
	32d		First (until Apr. 18) Third				VIII	XVIII III	III
15th		July, 1944	Third (until Sept. 22) Ninth	ADSEC	ADSEC VIII			XVI	XIX XVI
	15th		Third (until Sept. 22) Ninth	ADSEC	ADSEC VIII			XVI	XIX XVI
	17th		Third (until Sept. 22) Ninth	ADSEC	ADSEC VIII Ninth Army			XIX XIII XVI Ninth Army	XIX XVI
16th		Mar. 10, 1945	Third (until April 1) Fifteenth					XX	XII XX XXII
	16th		Third (until April 1) Fifteenth					XX	XII XX XXII
	19th		Third (until April 1) Fifteenth					XX	XII XX XXII
101st		Feb. 9, 1945	Seventh					XV XXI	XXI
	101st		Seventh					XV XXI	XXI
	110th		Seventh					XV XXI	XXI
102d		June 12, 1944	First Seventh (Atchd. Mar. 16-22)	V	V		V VII XIX	V VI	V
	20th		First Seventh (Atchd. Mar. 16-22)	V	V		V	V VI	V
	102d		First	V	V		V VII XIX	V	V
106th		July 6, 1944	First (until Aug.) Third	VIII	XV XII		XV	XV	XV
	106th		First (until Aug.) Third	VIII	XV XII		XV	XV	XV
	121st		First (until Aug.) Third	VIII	XV XII		XV	XV	XV
112th		July 4, 1944	First (until Oct. 22) Ninth	XIX	XIX			XIX XIII	XIX XIII
	113th		First (until Oct. 22) Ninth	XIX	XIX			XIX XIII	XIX XIII
	125th		First (until Oct. 22) Ninth	XIX	XIX		Ninth Army	XIX XIII	XIX XIII
115th		Mar. 12, 1945	Fifteenth Seventh (Atchd. from Apr. 25)		69th Inf. Div.				VI
	104th		Fifteenth		69th Inf. Div.				
	107th		Fifteenth Seventh (Atchd. from Apr. 25)		69th Inf. Div.				VI
	117th	Aug. 15, 1944	Seventh			VI		VI	VI

ORDERS FOR THE DELIBERATE ATTACK

by Colonel Hamilton H. Howze, Cavalry

(Colonel Howze was G-3 of the 1st Armored Division during most of the Tunisian campaign, and fought through the last actions in Tunisia as commanding officer of the 2d Battalion, 13th Armored Regiment. He was in command of the 13th Armored Regiment during the retraining period in North Africa, and the Italian campaign. Colonel Howze was awarded the Silver Star, *the* Bronze Star, *and the* Legion of Merit.—EDITOR'S NOTE.)

IN his articles in the *Infantry Journal*, Major General Orlando Ward warns repeatedly against leaning too heavily, in battle, on inspiration, suggests with much wisdom that practice among the various types of troops involved, and careful planning by higher echelons, are better assurances of success. Fruitful inspiration, he says, comes hard to the company officer when confusion and shell fragments become about equally thick.

Certainly many American attacks have failed altogether, or have failed partially, because of the lack of adequate tactical planning; additional others have failed because a plan, though proper, has not been adequately understood by subordinate commanders.

It will be acknowledged that no attack demands more careful planning nor more precise execution than the deliberate attack against a strongly prepared and strongly manned enemy position. Such a position normally is best taken by a sequence of intimately associated and accurately coördinated actions that methodically open the position to the attacker. Classic examples of expert planning, thorough practice, and superb execution are the German attack on Fort Eben Emael and the British attack at El Alamein, and some of our amphibious assaults deserve to be placed in the same high category. All these operations were preceded by repeated rehearsals.

It is obviously imperative, to effect the most overwhelming success, that each subordinate commander know what other commanders are doing, particularly in the matter of *time*. Once that it is settled, in the plan, that a certain system of attack is to obtain and a certain schedule is to be followed, the plan will gain tremendously in force if it is backed up by official, written orders, sufficiently detailed to insure understanding.

It is extremely difficult to get forth a detailed plan in the orthodox 5-Paragraph order, unsupported. Our present Paragraph 3 says, in effect, "Joe, do this, then do this, then do this, then do this and this," after which it tells Harry to "do that, then that, then that, and that and that"—and so on through all the units involved. Joe and Harry frequently have considerable difficulty in seeing how the fifth "this" fits in with the sixth "that," particularly in point of time. It is very possible in fact, that the true connection between them will not be apparent at all.

The coördination of the various "thises" and "thats" are settled in conference by Harry and Joe, and their decisions and agreements, though possibly correct, are not backed up by *orders*. In the execution, Harry, if a little weak, may plead misunderstanding, and Joe's attack may break down because Harry didn't secure the little patch of woods on his right. No officer can have seen much fighting in the last war who did not observe such a thing, perhaps frequently.

The "Phase Plan"—so-called for lack of a better name—which is here proposed is in effect a chronological organization of orders, as against the usual system of presenting instructions to each unit in order as it appears on the troop list. A very rough analogy is the A F of L horizontal organization as against the CIO vertical scheme.

It is necessary to emphasize that such detailed planning—and consequent volume of paper—is suggested only when a fairly generous amount of time is available for its formulation, for conferences and critiques upon it, and for its eventual publication and dissemination in orders.

The phase plan is eventually issued in the form of a table. An idea of its form and usefulness can best be given by an example. Certain objections to the phase plan may spring to the mind of the reader—especially if he is an adherent to the very excellent principle of allowing proper independence to the subordinate commander. It is my contention that neither this nor any other military principle is in any way violated by this scheme, but I shall reserve details of discussion until the end of the article.

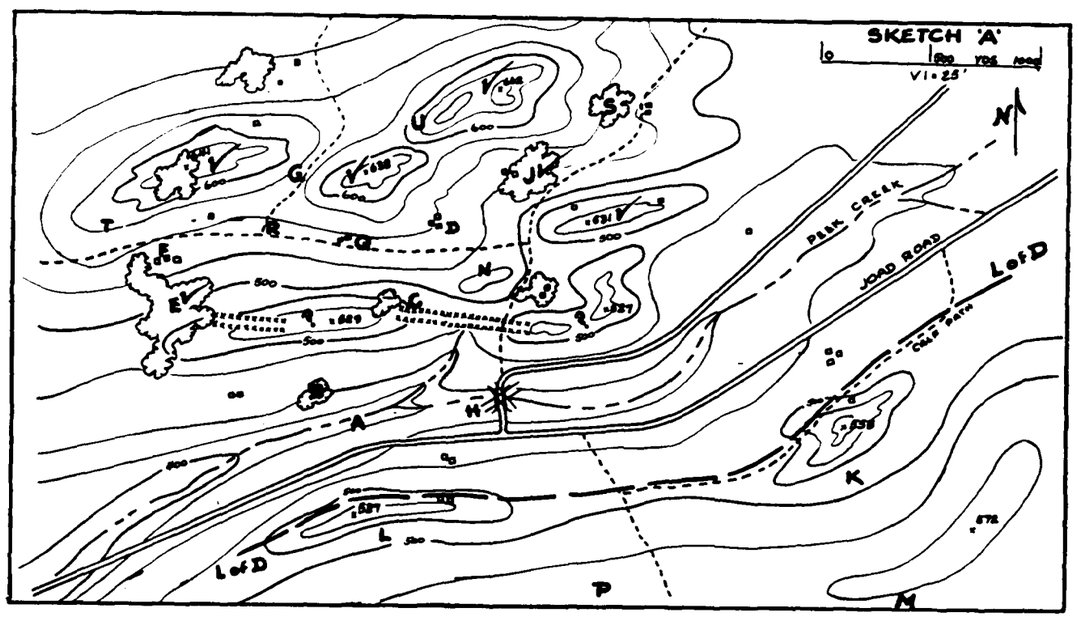
Situation: (See Sketch A).

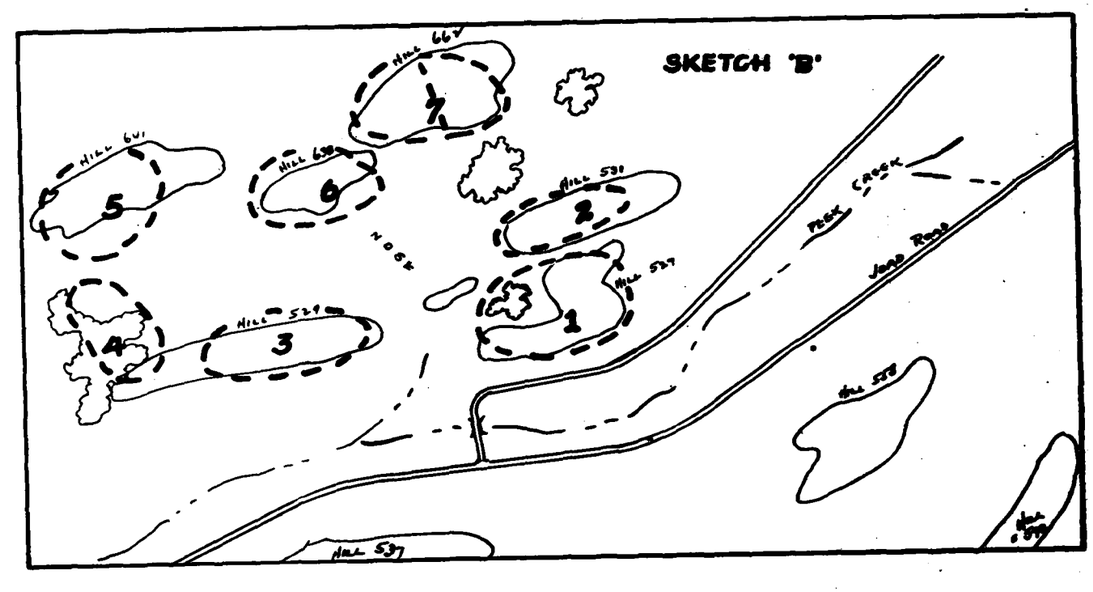
Blues (S) and Reds have been in present positions for a period of about one month.

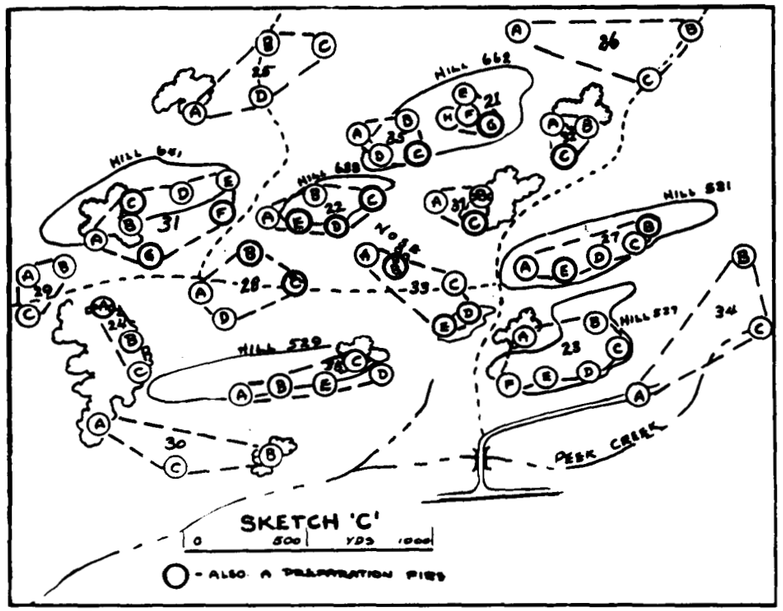
Blues intend to launch a general offensive in about 10 days. In this sector, Blues occupy Hill 537, Hill 558, and the ridge south of these two.

Peek Creek is practically dry, but the bed is sunken and requires engineer work to effect tank crossings. The bridge at H is down.

Reds are known to occupy Hills 641, 638, 662, and 531 (each indicated by a check mark), houses at D, and woods at E and J. Question marks indicate features possibly held: our patrols have frequently visited Hills 529 and 527, and sometimes are engaged by MG fire or enemy patrols, and sometimes are not. On features known to be occupied by the enemy, various intelligence sources have located accurately a number of enemy field-works, but no one feels that *all* enemy locations are known. Similarly, a number of enemy mortar, artillery and *nebelwerfer* positions are known, but not all. Antitank minefields are known to exist approximately where indicated. The Red infantry strength in the sector is thought to be two battalions of about 400 each, reinforced by AT guns. Enemy reserves available within two hours: one infantry battalion, 15 tanks (estimated).







This indicates a method, somewhat contrary to normal artillery practice, of making up a sheet indicating the prearranged artillery fires on call to assault commanders. The scale should be identical to that of the tactical map issued to small unit commanders, but the paper may be opaque. Included on the sheet are certain landmarks and contours taken from the map: enough to identify at a glance each of the concentrations and concentration blocks. A quick comparison of this sketch and Sketch A will closely locate any concentration on Sketch A; this will be made doubly sure if the using officer will copy merely the outlines of the concentration blocks on his map, here represented by Sketch A. Too much artillery data placed directly on the map will of course obscure it.

Concentrations are not merely KNOWN enemy positions; they include POSSIBLE enemy positions plus certain BLOCKING concentrations to cover a flank: e.g., 29A and 29C will be useful to block enemy fire coming into the left flank of our troops moving north onto Obj. 5. Concentrations selected are grouped into blocks primarily according to the wishes of the over-all assault commander and the battalion commanders, with careful consideration of their schemes and maneuver.

Numbering the concentration blocks and lettering the concentrations will help legibility, it being unnecessary to cram a three-digit figure into a small coumtdaining circle.

Date of attack, June 1. Dawn is at 0500 hours. Weather expected fair. Ground firm.

The Blue Corps Commander has ordered a general counterbattery program to be fired from 0400 to 0500 on D Day. Preparation fires will be as directed by each sector commander. Limits for time of attack have been set by the Corps Commander: H hour will be between 0445 and 0515.

Plan: (See Sketch A).

(This article is not designed to present a tactical problem—therefore, the scheme of attack here presented is considered as a commander's decision, right or wrong.)

In very general terms, the plan provides for:

a. A formal preparation to be omitted, but guns to be laid ready to fire a 5-minute preparation when the enemy indicates he has discovered the attack.

b. H hour to be at 0445 (15 minutes prior to first light) L of D as indicated on Sketch A.

c. An effort to be made to build by stealth a tank crossing over Peek Creek at A, the work to be covered by a small protective force at B.

d. TD overhead direct fire support to be rendered from vicinity of P.

e. Initial attack: 1st Bn 6 Inf to take Obj. 1, (see Sketch B); 3d Bn 6 Inf (+1 tank company) to take Obj. 3.

f. Engineers to gap minefield at C.

g. 2d Bn 6 Inf to take Obj. 2 (passing through Obj. 1).

h. 13 Tank Bn (—), moving via Gap at C, to take Objs. 4 and 5, and vigorously assist in taking Objs. 6 and 7.

i. 1st Bn (from Obj. 1) to take Obj. 6 from the west.

j. 3d Bn to take Obj. 7 (passing through Obj. 6).

k. As each objective is taken, fire to be placed on subsequent objectives and closely coordinated with the effort of the troops designated to take those objectives.

l. 1st Bn 7 Inf to remain in reserve throughout.

This plan is not particularly complicated, but neither is it entirely simple—not so simple, for example, as a straight frontal attack on Objs. 5, 6 and 7 (the main position) simultaneously. The plan will permit tanks to be used to their utmost; it takes advantage of the protection offered by the nose DN (extending Southeast from Hill 638) against fire from Hill 662; it provides for taking Hills 638 and 662 from the flank. Without attempting to hold a brief for this plan, the tactical soundness of which is unimportant to the object of this article, it is desired to emphasize that simplicity, however desirable, must sometimes be sacrificed in an attack against a strong position, and further that the resultant more complicated plan demands a clear presentation in orders so that they can be thoroughly understood and executed by the troops.

To effect the "coördinated execution" of this plan, it is proposed to present the details of it in a "Phase Plan" as previously mentioned. The phase plan does *not* preclude the necessity for the Paragraph 3 of the Field Order, but it does take over much of its function. The Paragraph 3 must clearly state the prime mission of each unit, still a necessary provision. As a sample, this briefer form of Paragraph 3 is stated for one unit only, the 1st Bn 6 Inf:

"3. *a.* The 1st Bn 6 Inf will attack to seize Obj. 1, assist by fire the attack on Obj. 2, and will attack in conjunction with the 13th Tk Bn to seize Obj. 6, and assist by fire the attack on Obj. 7. (See Phase Plan)."

SEE NOTES BELOW.

Phase	Time	Unit	Action
1 a.	0400	27 FA	Pieces laid for preparation fires (Concentrations 27E, 27B, 32C, 37C, 21G, 35C, 33E, 33D, 33B)
b.	0400	68 FA	Pieces laid for preparation fires (Concentrations 22C, 22E, 22D, 28B, 28C, 24A, 31C, 31F, 31G)
c.	0400	Co C 136 Chem Mtr Bn	Pieces laid for preparation fires (Concentrations Omitted)
d. (1)	0400	Mortars 1st Bn 6 Inf	—do—
(2)	0400	Mortars 2d Bn 6 Inf	—do—
etc	etc.	etc.	All preparatory fires made ready to be laid down on call
#2. a.	0330	1st Bn 6 Inf (Co F 6 Inf attchd)	Close in assembly area at K
# b.	0400	2d Bn 6 Inf (—Co F)	Close in assembly area at M
# c.	0400	3d Bn 6 Inf	Close in assembly area at L
# d.	0430	Co A 13 Tk Bn	Close in assembly area at L, attached on arrival to 3d Bn 6 Inf.
# e.	0330	Co C 16 Engr	Close in assembly area at L
# f.	0500	13 Tk Bn (—Co A); Co B 701 TD Bn attchd	Close in assembly area at (point 1000 yards south of L)
etc	etc	etc.	All elements are moved into respective assembly areas
3 a.	WO	27 FA	Execute preparatory fires (30 rounds on each of nine concentrations. Total elapsed time, 5 minutes)
b.	WO	68 FA	—do—
etc	etc.	etc.	All fire elements are similarly instructed. (Note: The preparatory fires are on call by the CO of any of the attacking infantry battalions, subject to approval by the force commander.)
#4 a.	0330	1st Plat Co K, 3d Bn. 6 Inf	Occupy woods at B, and from that point cover work of engineers building crossing at A.
# b.	0330-0430	2d Plat Co C, 16 Eng	Complete tank crossing at A. (Post Markers).
#5 a.	Cross L of D at 0445	1st Bn 6 Inf	Attack to seize Obj. 1
# b.	Cross L of D at 0445	3d Bn 6 Inf (+ Co A 13 Tk Bn)	Attack to seize Obj. 3. Pick up Plat at B. Tanks cannot see to shoot prior to 0510.
# c.	Cross L of D at about 0500	Gapping parties Co C 16 Engr	Follow directly behind 3d Bn 6 Inf to C.
# d.	0515	2d Bn 6 Inf	Close in assembly area at K. Await attack orders. Co. C, 701 TD Bn, joins and is attached.
# e.	0515	Co C 701 TD Bn	Closes in assembly area at K. Attached to 2d Bn 6 Inf.
# f.	0530	1st Bn 7 Inf	Close in assembly area at M. Remain in Reserve in that locality.
#6 a.	0445	Co A, 701 TD Bn	Occupy previously selected positions at P.
b.	0515 UOL	—do—	Engage by fire targets of opportunity which may appear on forward slopes of Hills 638 and 662, beyond (north of) the line QDJ, *only* (See Note (8)).
7 a.	WO	27 FA	Fire counter mortar program (Conc. omitted)
b.	WO	68 FA	—do—
etc.	etc.	etc.	Similar instructions to all high angle fire units, including infantry battalion mortars. Mortar program based on known and suspected positions, and developed over period of last month. On call by CO of any attacking battalion, upon approval of Force Comdr.

Phase	Time	Unit	Action
#8. a.	0545 (Target Time)	1st Bn 6 Inf (+)	Occupy Obj. 1. Engage by fire targets on Obj. 2 and at points N, D, and J. Cover by fire engineer gapping parties at C.
# b.	0545 (TT)	3d Bn 6 Inf (+)	Occupy Obj. 3. Engage by fire targets on Obj. 4, 5 and 6, and at Point Q. Protect engineer gapping parties at C.
# c.	0545 (TT)	Gapping parties Co C 16 Engr	Gap minefield (minimum gap width 24 feet) at C. Estimated completion time 20 minutes after Target Time. Post markers. Notify CO 13 Tk Bn.
9. a.	WO	2d Bn 6 Inf (+)	Move via Obj. 1, attack to secure Obj. 2.
b.	WO	13th Tk Bn (—)	Move via route: west of Hill 537—A—gap at C, to seize Obj. 4 and Obj. 5, in that order.
c.	WO	3d Bn 6 Inf	Assist, with one company (Co K) the attack of the 13th Tk Bn on Obj. 4. Emplace the attached tank company (Co A) on Hill 529 to overwatch the attack of the balance of the 13th Tk Bn; on arrival in that overwatching position, Co A reverts to command of CO, 13th Tk Bn.
d. (1)	WO	Co C, 136 Chem Mortar Bn	Smoke line UJ, to block off Obj. 7. However, if wind should commence carrying smoke westerly, cease smoking operations immediately.
(2)	WO	Mortars, 1st Bn 6 Inf and 1st Bn 7 Inf	Fire concentrations—and— (assumed just north of Point N, actual locations omitted).
(3)	WO	68 FA	Fire concentration Block 33.
(4)	WO	27 FA	Fire Concentration Block 33.
(5)	WO	Co A 701 TD Bn	Watch particularly for, and engage any enemy tanks which may appear vicinity Obj. 6 or in gap at G. (Phase 9d is designed to protect R flank of 13th Bn as it makes the dangerous turn after passing through minefield at C).
#10. a.	0700 (TT)	2d Bn 6 Inf (+ Co C 701 TD)	Occupy Obj. 2. From that position: Protect R of force, and assist by fire the attacks on Obj. 6 and Obj. 7. (See Phases 11c and 13c below.)
# b.(1)	0700 (TT)	Elements 13th Tk Bn (—) (Assisted by Co K, 6 Inf)	Occupy Obj. 4 } Operations against Objs. 4 and 5 are concurrent.
# (2)	0715 (TT)	—do—	Occupy Obj. 5.
11. a.	WO	1st Bn 6 Inf (+)	Move from Obj. 1, via route: S of Obj. 3—Point R, to attack Obj. 6.
b.	WO	13th Tk Bn (—)	Emplace one company to secure Obj. 5. With remainder of force, assist 1st Bn 6 Inf (+) in attack on Obj. 6. (Tanks should be able to climb western face.)
c.	WO	1st Bn 7 Inf	Move to reserve position vicinity Obj. 2.
12. a. (1)	WO	2d Bn 6 Inf (+)	Lift fire from Obj. 6. Continue fire Obj. 7.
(2)	WO	—do—	Lift fire from west half Obj. 7. Continue fire on east half.
(3)	WO	—do—	Lift all fire from Obj. 7.
b. (1)	WO	Co A 701 TD (at Point P)	Lift fire from Obj. 6. Continue fire on Obj. 7.
(2)	—do—	—do—	Lift fire from Obj. 7.
13. a.	0815 (TT)	1st Bn 6 Inf (+)	Occupy Obj. 6. Support by fire attack on Obj. 7.
b.	WO	13th Tk Bn (—)	Continue to occupy Obj. 5. Co A may be moved forward from Obj. 2. From Point G and Obj. 6, support, by fire, attack on Obj. 7.
# c.	WO	3d Bn 6 Inf	Move via Obj. 6 to attack Obj. 7 (Start of movement may be ordered prior to completion of Phase 13a.)

#14.	0915 (TT)	3d Bn 6 Inf	Occupy Obj. 7. Clean out woods at S.
15. a.	WO	One Company 13 Tk Bn	Move via route R—Q—D to flush (by fire) enemy from woods at J. If resistance continues, 2d Bn 6 Inf will (on order) assist, by occupation of woods.
b.	WO	2d Bn 6 Inf	(See above)
#16. a.	Without Orders	3d Bn 6 Inf	Organize Obj. 7 for defense against counterattack (See 16d (1) below).
# b.	Without Orders	1st Bn 6 Inf (+)	Organize Objs 5 and 6 for defense against counterattack.
# c.	WO	13th Tk Bn	Assemble Bn in area GRQ in counterattack reserve and in preparation for missions of exploitation. Emplace one platoon in direct firing position at G and one at T, to engage targets of opportunity and to resist possible counterattack.
# d. (1)	WO	2d Bn 6 Inf	Send Co C 701 TD to Obj. 7, where it becomes attached to 3d Bn 6 Inf.
# (2)	WO	2d Bn 6 Inf	Force Reserve. Assemble vicinity Point N.
e.	WO	1st Bn 7 Inf	In vicinity Obj. 2, remain assembled and prepared for exploiting mission in conjunction with 13 Tk Bn.

NOTES:

(1) To spare reader unnecessary detail, the "Phase Plan" is not entirely complete.

(2) "WO" equals "When Ordered." "UOL" equals "Until Ordered Lifted."

(3) "TT" equals "Target Time," or estimated time of accomplishment. This is at best an educated guess, but it serves to inform all concerned of the commander's idea of the time necessary to accomplish each job.

(4) "#" equals "Report Necessary." A report of accomplishment of this phase is mandatory. Such a report need be no more than (for example), "Phase Six Able, Okay."

(5) Routes to assembly areas are omitted.

(6) To fit all available firepower properly into the whole scheme of fire, certain missions are prescribed even for such elements as the infantry battalion mortar platoons. These missions are confined however to the mortars' respective parts in the preparatory fires and the countermortar program, and the infantry battalion commander retains first call on his mortar fire.

(7) Time schedule may be changed as the action progresses. Favorable results may speed it. Note that Phase 11*a* may be ordered before Phase 10*b* (2) is completed.

(8) Tanks or TD elements rendering direct fire support from stationary positions do so best according to a prearranged schedule, engaging specific known, suspected, or probable enemy positions. Careful, previous reconnaissance is necessary, and ground horizontal photographs to identify each target selected will be especially valuable.

It will be noted that the phase plan specifies certain actions by parts of subordinate units; an example is Phase 4 Able, which specifically requires the 1st Plat, Co K, 6 Inf (which still remains under command of the Battalion Commander) to occupy the woods at B to cover the engineers. This and all the other details of the plan should have been discussed carefully with the subordinate commanders, the plan perhaps modified according to their ideas, and, where practicable, their willing approval of it obtained. Then, after conference and discussion, the final scheme is made official and specific by publication as a part of orders.

Rigidity certainly need not result from the use of such a plan. The entire scheme may be abandoned by a single radio order, and nothing shall have been lost. *Modification* should be expected as normal, but modification is exceptionally easy to effect, since the original scheme is firmly impressed on all concerned. The phase plan is a good framework on which to hang changes, and the orders are usually simple: "Delay execution of Phase 2 by one hour," for example; or perhaps the reserve might be ordered to execute a phase originally the responsibility of another unit.

As intimated above, the phase plan becomes an excellent convention and a low-order code. In the situation described, one of the leading infantry battalions may come under considerable fire after it crosses the Line of Departure: to obtain the entire preparatory fire program the Battalion Commander merely asks, "Request execution of all of Phase 3." A request for execution of Phase 7 should bring down the entire countermortar program—or such parts of it necessary to engage the general area where enemy mortars are thought to be firing. Request for Phase 9 Dog will cover by fire the right flank of the tanks making a flanking movement in the face of the enemy. The arrival of the 3d Bn 6 Inf in its assembly area is reported by "Phase 2 Charlie, Okay." "Execute Phase 6*b*" will launch all the action listed there under. And so forth.

The writing of the phase plan demands that the commander think completely through his battle, to include the organization of the objective against enemy counterattack. It sets down, in detail, the scheme of maneuver, so that all concerned may thoroughly understand the commander's object and methods, beyond possibility of doubt.

Although the various phases of the phase plan are numbered and listed in approximate chronological order, the chronology may vary, and some phases are actually concurrent with others. However that may be, the subordinate commander will gain a very accurate idea of the expected or intended sequence of events, and where, in that sequence, he fits, where flanking or following units fit, where direct and indirect supporting fire units fit.

Finally, it may be said that the phase plan works, in battle, and furthermore that it is not offensive to subordinate commanders who have had ample chance to study it previously and suggest change; rather, battalion commanders, in my experience, welcome specific responsibilities and appreciate definite fixing of tasks upon themselves and upon units to their right and left —units upon which depend so heavily their own success and well-being.

The Tank-Infantry Team In An Armored Division

*by Major Edward Bautz, Infantry**

MUCH has been written about the Tank-Infantry team as it applies to infantry divisions but little has been said about the modern bases of the Armored Tank-Infantry team—the tank and armored infantry battalions of the Armored Division. Here we have team work at a high level; having lived, worked, traveled, trained, and played together, the officers and men of these battalions more readily understand each other's problems, capabilities, and limitations—which is the primary requisite of any successful team. The Armored Tank-Infantry team is a part of the larger team which embodies the artillery, cavalry, engineers, air corps, and all supporting services. Proper employment of this team provides for the violent attack which makes manifest the potential shock action which is organic in the Armored Division, and in which speed, maneuverability, and fire power are combined and utilized to the fullest.

The following discussion is based on experience with the 4th Armored Division throughout the campaigns in Europe. It is one way in which tanks and infantry may be employed and its results have indicated it to be a successful way.

Let us examine more closely the Armored Tank-Infantry team, remembering always that it is only a part of the larger team. The infantry battalion consists of three rifle companies, a headquarters company, and a service company. The tank battalion consists of three medium tank companies, one light tank company, a headquarters company, and a service company. In each case the service company includes a maintenance platoon, and the headquarters company a reconnaissance, mortar, and assault gun platoon. In addition, the headquarters company of the infantry battalion possesses a heavy machine-gun platoon. Each of these battalions is administratively complete and thus is extremely flexible for tactical employment.

There are two ways of combining these battalions to make Tank-Infantry teams. First, we may attach an infantry company to a tank battalion and a tank company to an infantry battalion. The advantage of this system is that the next higher headquarters (Combat Command) has two complete subordinate headquarters, with commander and staff properly organized, which may be assigned separate phases of coördinated operations, or independent tasks. In assigning any particular mission, the combat commander will select the "infantry-heavy" team or the "tank-heavy" team in accordance with the type of the task. For example, if there are rivers to be crossed, woods to be cleared out, or cities to be seized, it is evident that the "infantry-heavy" team should be assigned this mission; conversely, when it is expected that a large number of enemy tanks or other armored vehicles will be encountered, the "tank-heavy" team would receive the call. The battalion not assigned the principal rôle remains in close support, ready to grasp any opportunity or unforseen "break" arising, or to neutralize and nullify any surprise hostile action. The disadvantages of this system are that a non-organic element must be combined with, or attached to, a battalion, and normal administrative channels are somewhat disturbed. It places added administrative burdens on the attached company commander which would normally be absorbed by the battalion staff of his own battalion. From the battalion viewpoint, additional administrative arrangements must be made. For example, the armored infantry battalion does not have sufficient heavy wrecking equipment to evacuate knocked out tanks, and the tank battalion trains do not normally carry all types of ammunition required by an armored infantry company. To overcome this, small service elements of one battalion must be attached to the other battalion, which simply means the addition of another nonorganic element. In addition, enemy action, terrain, and the general enemy situation often do not permit the assignment of missions in accordance with the composition of the team and according to academic principles. Therefore, the "tank-heavy" team may find itself with a powerful force, but lacking sufficient infantry to execute effectively and efficiently the assigned mission, or any particular phase of that mission. The inverse is obviously true of the "infantry-heavy" team.

There is a second way of making an Armored Tank-Infantry team whereby the medium tank companies and the armored rifle companies are teamed together and in which both battalions operate in an integrated fashion. It may be said that this leaves the light tank company without infantry support but, if the situation warrants, a platoon may be attached to the light tank company from the armored infantry company least apt to be employed. It should be noted here that light tanks have a different mission than medium tanks and that infantry support, although desirable, is not as necessary in the

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accomplishment of their mission. The armored infantry ride with the tanks in their carriers, or on the tanks, and know tanks well enough to know how to protect them. Generally speaking, the infantry mission is to protect the tanks against close-in enemy attack with antitank rockets, grenades, explosive charges, etc. On the march, this may be accomplished by the infantry riding on tanks or in carriers and keeping careful watch to the immediate flanks; i.e. checking roadside ditches, clumps of bushes or woods, and windows in buildings. All doubtful areas are explored by fire by both infantry and tanks as they pass by. When it becomes necessary for the infantry to dismount and fight on foot, such as in town fighting, the same general system applies. In either case, aggressive infantry action, whether by fire alone or by fire and movement, is the best method of protecting the tank. It must also be remembered that the only place tanks cannot go is where it is physically impossible for them to go. There is no such thing as "tanks can't fight at night" or "tanks can't fight in towns" or "when the situation is uncertain, lead with infantry." Tanks and infantry move together wherever it is physically possible for the tanks to go. No definite formation is prescribed, for it varies with the terrain, enemy dispositions, and as the immediate mission changes. Supreme confidence in each other is the keynote to success, and this is soon realized in battle with tanks and infantry that have had the opportunity to train and live together. The tanks must take the initiative by virtue of the maneuverability and superior communications. Company commanders of infantry companies ride with company commanders of tank companies, infantry platoon commanders ride with tank platoon commanders, both battalion commanders stay close to each other, and their command posts are also together. With little transitional training, subordinate commanders of both battalions readily accept and understand orders issued by either battalion commander or members of either staff. With this type of team the combat commander must take a personal hand and will normally ride with or be near the two battalion commanders. In his absence, a battalion commander must definitely be designated as commander of the entire force. In actual practice with well-trained units, it is not necessary to designate an infantry company commander or a tank company commander as team commander in so many words. By experience and coöperation, and without formal order, an infantry commander takes over for an infantry mission and a tank commander for a tank mission, and in either case help each other in every possible way. This, however, is the goal to strive for, and in training or in initial action with strange troops teamed, it may be necessary to go by the rule: "The supported unit commander is in command." Thus, as the mission changes from a tank mission to an infantry mission, the commander is also changed. Except for particular instances (such as independent missions), staff officers must not be used to command the individual Armored Tank-Infantry company teams. If this is done, the whole operation of the staff is disrupted. Staff officers must be used freely to issue orders, inspect the progress being made, coördinate use of artillery, engineers, air, etc., and assist in making plans for future operations. This does not preclude a staff officer traveling with a team or moving along with any phase of an attack. In fact, this is desirable, since he takes over the duties of coördination and liaison with other units and supporting elements and thus permits the company commander to devote all his energies to the direction of his company. At the same time he is in a position to completely comprehend the situation and advise his commander. Properly employed, there are no excess staff members. Coöperation between units is directly dependent upon coöperation between individuals. When the commanders manifest the spirit of coöperation, then, and then only, can this system be successfully employed.

There are two distinct types of offensive operations in which the Armored Division is employed, commonly termed the "Rat Race" and the "Slugging Match." The former is characterized by rapid advances against spotty resistance of up to 100 miles a day, where the objectives are more or less strategic in nature—key terrain, bridges, road centers, railroad centers, sealing off a pocket, etc. In more technical language, it embodies the exploitation and pursuit. In contrast, the "Slugging Match" is characterized by advances counted in thousands of yards or a few miles a day against constant and usually strong resistance. Here the objectives are limited, consisting mainly of terrain dominating the immediate field of battle. This may be called the straight attack and may develop into an exploitation. In either case, a combination of tanks and infantry is more desirable than either one alone.

We have said that the "Rat Race" is characterized by rapid movement. The armored infantry may be mounted in their carriers or on tanks. In the latter case the carriers may be filled with ammunition, rations, fuel, and other supplies. Assuming that the Armored Tank-Infantry team is made up by matching company by company, let us see what further dispositions might be made. The light tank company with the assault gun platoons of both battalions attached, and perhaps one platoon of armored infantry, can lead or operate on an exposed flank. If the combat command is advancing along one road, between individual teams tactically spaced would be interspersed artillery, engineers, cavalry, trains, and other attachments allotted to the column.

Proper spacing and combination provides for elements near the front to crash through moderate resistance, to remove obstacles, or to provide a base of fire for other elements deeper in the column to maneuver. The actual order of march is a vital command decision but will not be touched upon here since discussion would require the building of a situation and appraisal of the entire combat command rather than merely of the Armored Tank-Infantry team about which we are concerned. The following might be considered as a typical order of march for a combat command:

Light Tank Co. + Aslt. Gun Plats. Tank and Armd. Inf. Bn.

Command Group Tank and Armd. Inf. Bn. (*combat commander).

Medium Tank Co. and Armd. Inf. Co.
One Plat. Armd. Eng. + Bridge Truck.
Medium Tank Co. and Armd. Inf. Co.
Armd. F. A. Bn. (105mm SP).
Armd. Eng. Co. (—one Plat.).
Hqs. Co. Combat Command.
Hqs. Co. Div. Arty.
Armd. F. A. Bn. (105mm SP).
Hqs. Cos. Tank and Armd. Inf. Bn.
Medium Tank Co. and Armd. Inf. Co.
F. A. Bn. (155mm How.—towed).
Trains + (Btry. Antiaircraft).
Armd. Med. Co.
Armd. Ord. Co.
Mech. Cav. Troop + T. D. Co. on flank.

If the force is moving in more than one column, the light tanks may be used on one flank, and individual teams may be used to cover the other flank or take particular objectives off the main route. It is preferable that the main column move on the best road so that the trains may have the least difficulty in keeping up. Advancing in multiple columns makes possible a bigger sweep of area as well as shortening the time interval necessary for columns to close. The individual team of a tank company and armored infantry company combined is powerful enough to make a large attack and it is unhampered by trains and other administrative vehicles. For example, when attempting to seize a crossing over a river the chances of securing a bridge are greater if the force is divided, and three columns strike simultaneously for three bridges. If one of the small columns does become engaged with a force too large for it to handle it can easily be moved around the position, or their steps can be retraced and resistance by-passed at some distant point. It is also possible for these columns to use poor roads or to travel cross country for relatively long distances, and by doing so increase the chance of surprise. In this type of operation the entire force bivouacs in close formation and all-round security is provided. This is easily done with balanced Armored Tank-Infantry teams. The infantry can easily outpost the tanks and may assist the tanks in refueling, resupplying, and maintenance. At the same time, the tanks are in position where they may employ all of their weapons to support the infantry in case of an attack. Assault guns, mortars, and other similar organic means are emplaced, registered, and data computed for defensive fire. All elements of attached arms are coördinated to provide security from attack for 360 degrees. In this type of operation, all-round security is most important, for it is not unusual to be cut off from the rear. It was also found that command could be more easily exercised in this type of operation from a peep (¼ ton C&R) than from a tank. Difficulty was first experienced in communications, but by modifying the electrical system of the peep from six to 12 volts and replacing the SCR-510 by the SCR-508 this difficulty was eliminated.

Now let us consider what we have called the "Slugging Match." It was in this type of operation that the system of matching up tank and infantry companies was first employed. It has been previously stated that this type of operation was characterized by seizing one dominant terrain feature after another until the final objective was taken, or the limit of the day's operation was reached. In this case, the light tanks were normally used to follow up and protect the flanks that were opened by the advance of the medium companies. The armored infantry may ride in their carriers or on the tanks; the terrain and trafficability normally dictating the best solution, since the present carrier does not have the maneuverability of the tank. As in every operation, all plans are carefully laid in advance, including necessary artillery preparations and contemplated air strikes. The attack is then launched by each of these complete teams which move out one after the other and seize successively the dominant terrain features. This is a process of leapfrogging; when the first team reaches its objective it is in position to support the second team as it moves on to its objective. With three equally balanced teams, this process can be kept up almost indefinitely. At the same time, there is usually one team that is not engaged at any given moment; this team is then available as a reserve to reinforce one of the other teams or to take care of any unforeseen developments such as an enemy counterattack or a wide flanking movement. Coincidentally this team will have the opportunity for rest, maintenance, and resupply. The infantry again supports the tanks in the manner described before. A squad or half squad may be assigned to support each tank, or the bulk of the infantry may be shifted to support only a few tanks at any given time. The commanders again ride with each other and orders are issued over the tank radio. During these operations the mortar and assault gun platoons may be combined to supplement the support provided by the artillery. Frequently, however, the assault guns are employed well forward and deliver direct fire. It was found that these weapons could fire smoke missions very effectively and concentrations could be placed in small areas that the artillery was not reaching. The command post of these battalions is moved by bounds and is operated from stationary positions most of the time. By so doing the command post may be kept defiladed and usually within about 1,000 yards of the battle troops. This facilitates its functioning and there is little to fear from enemy action. Normally the executive officer and the S-1 operate the command post, handling all orders from higher headquarters, relaying information back to higher headquarters, handling all administration, resupply, and maintenance.

*Combat commander with such personnel as he may desire travels well forward in the column but frequently moves about.

The battalion commander with the S-2 and S-3 actually conducts the battle, while the S-4 circulates among the companies, command post, and higher echelon supply agencies. It is usual for company maintenance sections, less recovery vehicles, and all "thin-skinned" vehicles to remain with the battalion command post. Bivouac security is performed in the same manner as in the formation before described, with the exception that it is necessary to pay less attention to the rear since relatively short advances cross country permit a link-up or tie-in between flank units. This presents to the enemy a continuous line which runs the entire length of the front.

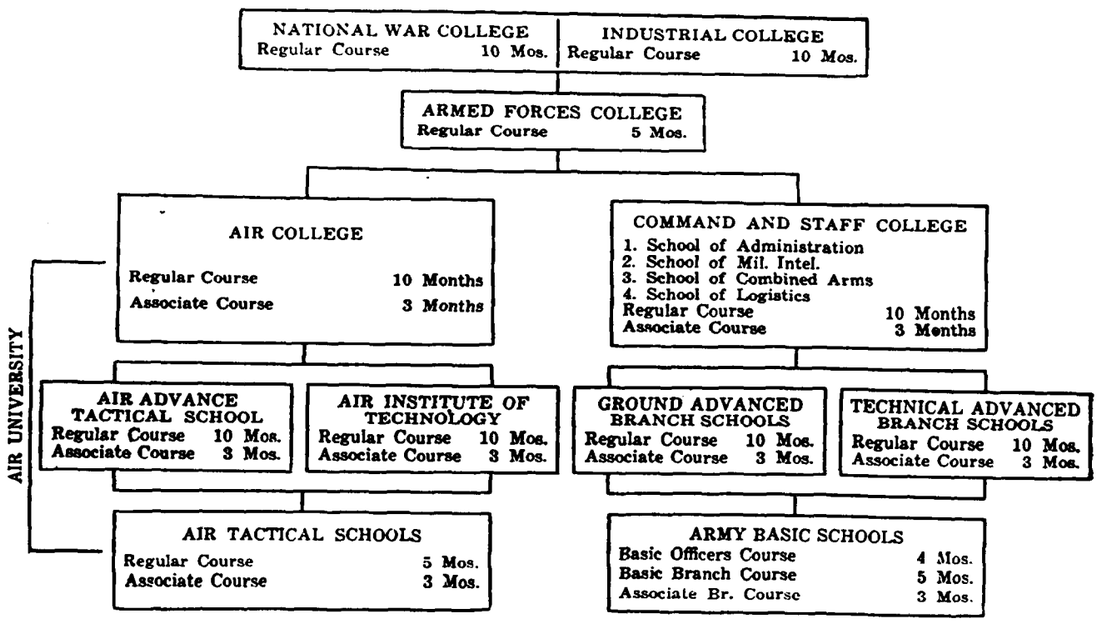
We have had a glimpse of the Armored Tank-Infantry team; we may consider it a model in teamwork. It is perhaps felt that little has been said about Tank-Infantry coöperation. Long periods of training together and living together provide the necessary spirit of co-operation which wins battles. Both tanks and infantry must be trained to attack. This makes for aggressiveness and develops an offensive state of mind that is ready and anxious to plan and execute; the spirit of co-operation comes spontaneously, and with this spirit manifest no missions will seem too difficult. This spirit is perhaps best embodied by the words of a sergeant tank commander who was overheard to say, "They've got us surrounded again—the poor so and so's." Success in the Armored Division depends primarily on a frame of mind which dictates attack at all times. Through such an attitude, the shock action, fire power, maneuverability, and speed of the armored Division is employed to its fullest.

NEW SCHOOL PLAN FOR OFFICERS

A REORGANIZATION of the Army officers' educational system has been approved to provide for the progressive military education of an officer from the time he receives his commission until he completes a course at a high-level school conducted on a joint Army-Navy-and-Air basis.

The system would provide training during the first 20 years of an officer's active duty, the formal schooling integrated with periods of practical experience in the field.

First for all officers except those in Air Forces would come a four-month course in subjects common to the Army as a whole followed immediately by a five-month basic branch course for indoctrination in subjects of his branch. Other higher-level courses would follow. —*Army Times.*



TANK COMBAT FIRING

*by Brigadier General Bruce C. Clarke**

The training methods outlined herein were developed in the 4th Armored Division and successfully used by Brigadier General (then Colonel) Bruce C. Clarke in that division and later in the 7th Armored Division, to obtain perfection in crew training.

EXCELLENT results were secured by the use of simple methods of developing and testing crew technique. Too much emphasis cannot be placed on the observation of test runs by crews who are waiting for, or have completed, their tests; the officer critique after each run; and the encouragement among all participating personnel of free discussion and constructive comments which frequently lead to the development of desirable and efficient crew procedures that may be standardized within the unit. The training doctrine expressed herein is concurred in by The Armored School. Crew training is a basic subject to which too little attention has been given in the past.

Aside from a few special situations, tanks on an offensive mission engage the enemy by closing with him during an advance. In such an operation the tank comes under observation and fire of an enemy tank or antitank weapon, or comes unexpectedly upon other enemy forces. In either case, the tank is usually moving when it sights a target. The success of its mission, and in most cases the safety of the tank and crew, depend upon the ability of the crew to take the enemy target under fire effectively within a few seconds; in short, to "shoot from the hip and hit." Such shooting is not done at long ranges—100 to 600 yards is the rule. The tank fires to hit on its first shot. It must out-shoot the enemy to live.

Each member of the crew must be trained to proficiency in his particular job in order that the crew may be able to take a surprise target under fire quickly and effectively. In addition, the crew must be trained as a team in order that all of the several actions required of the members can be performed quickly in proper sequence, so that the first shot is fired promptly and sensed properly and subsequent shots, if necessary, follow the first in rapid succession, with proper and immediate corrections applied.

Until the tank crews of a unit are trained to such a standard they will not have the confidence necessary to cause them to attack with the abandon and violence which characterizes the most effective tank action.

Individuals of a tank crew are trained to the proficiency set forth by FM 17-12 (Tank Gunnery) FM 17-67 (Crew Drill Med. Tank), and FM 17-68 (Crew Drill Light Tank). FMs 17-74 and 17-75 cover the M26 and M24 tank respectively. The status of the crew's training should be checked continually.

The next step is the preliminary crew training. This training consists initially of the tank commander working alone with each of the other members of the crew in turn, to perfect the commander-driver, commander-gunner, etc. relationships. This training is followed by dry-run practice with the whole crew until they are working together smoothly.

*Deputy Assistant Chief of Staff, Plans Section, AGF.

The commander-driver training can be carried out by maneuvering the tank in an area, with the tank commander giving commands in the prescribed manner until a mutual understanding between him and the driver is developed, and the expected reaction of the driver to the commander's orders is obtained.

The tank commander and gunner required the maximum training in working together. This can be accomplished by placing the tank in a stationary position where it has observation over varied terrain and having the commander select targets, issue orders, and work with his gunner until there is a smooth and rapid response to the proper fire orders.

The relationship between commander-driver and "bog" should not be neglected. Time spent in making sure that the loader functions without wasting precious seconds pays dividends.

When the proficiencies indicated above have been obtained, the whole crew can practice together and be checked by having an officer ride the back of the tank as it moves along a prescribed route. At intervals along this course the officer designates targets of various kinds and checks the orders of the tank commander and the execution of them by the members of the crew. More than one course is desirable. Later in the training, the time element should be introduced competitively between crews. The time is taken from the moment the commander acknowledges the target designated to the moment when the gun is layed. The laying is then checked.

The next step is combat firing. The ideal area for such firing is one in which the gun can be fired in any direction. Such areas are not usually available. The results can be suitably approximated in an area where one is permitted to fire in a small sector only. In such a setup, an area of about 500 by 1,000 yards is required, the longer axis parallel to the line of fire. The nearest 600 yards of the area is used as a maneuver area, the farthest 400 yards as the target area. Targets may consist of almost anything: old vehicles, car bodies, or silhouettes. A valuable addition to the course is a moving target towed on each end by a tank.

The firing and testing is done as follows: The tank crew mounts, does the necessary checking (see FM 17-67 and FM 17-68), and when ready, the conducting officer mounts and has the tank move on a meandering course in the maneuver area. During the movement along the course, the conducting officer points out targets one at a time to the tank commander who takes them under fires. The conducting officer notes the time necessary to get off the first shot, and subsequent shots, if they are fired. He also notes the fire orders, sensings, actions of driver, gunner, loader and "bog," and records the results on the suggested form, shown herewith. During progress over the course, he selects and designates targets which will require the use of all the weapons and in several directions relative to the path of the tank. The tank commander is told to order the proper ammunition, even though only HE may be actually used in the cannon for safety reasons. He also is told to fire only a limited number of rounds at a target, even thought he does not get a hit.

After the crew returns to the starting point it is critiqued by the conducting officer before all other available crews. With several tanks and several conducting officers, maximum use can be made of the range. About six targets on a run is sufficient. More than one run is desirable for each crew. Its improvement during subsequent runs will be readily noted. It is easy to grade the crews relatively and to foster considerable competition within a platoon or company. The crews take great interest in this type of firing.

Safety Officer. The conducting officer is also safety officer. He designates targets which have such a relative position to the tank that the firing will take place within the allowable firing limits.

Firing by Tank Destroyers. While this type of firing is probably less applicable to tank destroyer crews, they will receive considerable benefit from the same course of instruction and firing.

RECORD OF TANK CREW COMBAT FIRING

Place ..... Date 194

Tank Comdr ..... Gunner .....

Driver ..... Loader .....

Bow Gunner .....

TARGET RECORD

Target Order	Type Target (Trk, Tk Doughs etc.)	Range	Direction (Front, Rt, Left Rr, etc.)	Time to fire 1st shot or burst	Sensing	Time to fire 2d shot	Remarks as to hits, etc.
1							
2							
3							
4							
5							
6							
7							
8							

Comments

a. Tank Comdr's Commands: .....

b. Actions of Driver: .....

c. Actions of Gunner: .....

d. Actions of Loader and Bow Gunner: .....

e. General Comment on Crew: .....

f. Any Malfunctioning of Tank: .....

Conducting Officer

Critique will be conducted before remainder of company on return to Starting Point.

Cavalry in World War II

*by Major Hal D. Steward**

A TOTAL of 91,948 men served with the Cavalry during World War II.

This number was reached when cavalry was at its maximum strength on May 31, 1945. Further statistics on the numbers of officers and enlisted men who served both in the continental U. S. and overseas are given in the table below.

A total of 73 nondivisional cavalry units were in active service between December 7, 1941 and May 30, 1946, compared with only 20 such units still in active service on March 30, 1946. These 20 units were comprised of eight Mechanized Cavalry Groups, 11 Mechanized Cavalry Reconnaissance Squadrons, and the U. S. Military Academy Cavalry Squadron at West Point.

STRENGTH OF THE CAVALRY ARM

May 31, 1945 (Peak Strength)	Officers	Enlisted Men	Total
In Continental United States	2,845	19,298	22,143
Overseas	6,087	63,718	69,805
Total Os or EM	8,932	83,016	
GRAND TOTAL			91,948
March 1, 1946	**Officers**	**Enlisted Men**	**Total**
In United States	3,989	9,065	13,054
Overseas	1,967	17,646	19,613
Total Os or EM	5,956	26,711	
GRAND TOTAL			32,667

Of the original 73 nondivisional units, 13 Mechanized Cavalry Groups and one unattached Cavalry Reconnaissance Squadron fought in the European Theater of Operations. (A mechanized cavalry group was composed of group headquarters and headquarters troop and two attached mechanized cavalry reconnaissance squadrons.)

Groups were assigned to armies, and habitually attached to corps. Most of these attachments were permanent. Corps frequently attached these units, for operations only, to divisions—usually Infantry Divisions.

The 13 Mechanized Cavalry Reconnaissance Squadrons fought in the ETO as organic units of Armored Divisions (light), and two Armored Reconnaissance Battalions as organic units of Armored Divisions (heavy).

Forty-two Cavalry Reconnaissance Troops fought in the ETO as organic units of Infantry Divisions.

The only Cavalry Division to fight in World War II as a complete unit was the 1st Cavalry Division, which fought in three major campaigns in the Southwest Pacific, and now is occupying Tokyo.

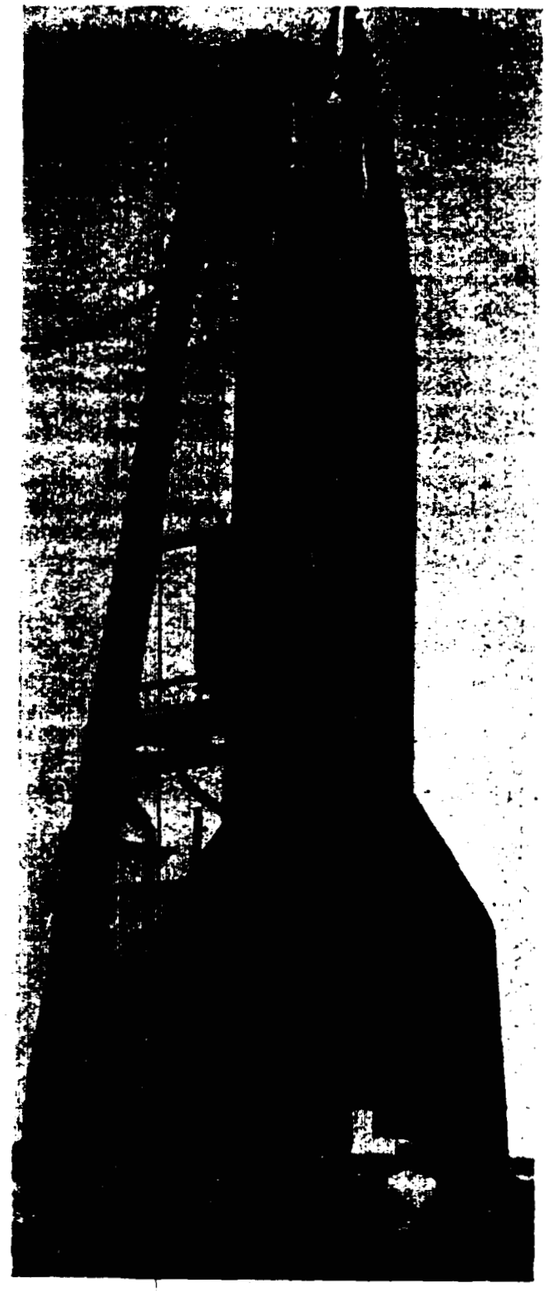
During the fighting in Europe, mechanized Cavalry units were usually assigned one of the five following types of missions: (1) Offensive combat, including attack as well as pursuit and exploitation. (2) Defensive combat, including defense, delaying action and holding of key terrain until arrival of main forces. (3) Reconnaissance. (4) Security for other arms, including blocking, moving and stationary screening, protecting flanks, maintaining contact between larger units and filling gaps. (5) Special operations, including acting as mobile reserve, providing for security and control of rear areas, and operating as an army information service. The accomplishment of reconnaissance missions normally involved offensive combat as frequently as did the accomplishment of security missions.

Types of missions assigned to mechanized cavalry groups, based on 12 such units in combat were: defensive combat, 33%; special operations, 29%; security, 25%; offensive combat, 10%; and reconnaissance, 3%. Percentages are approximate.

From surveys, the following striking points were revealed: (a) The performance of pure reconnaissance missions by mechanized cavalry groups was rare; (b) the performance of defensive missions by mechanized cavalry groups was common; (c) the ratio of days of primarily mounted employment was about 1.8 to 1; and (d) for performance of offensive, defensive and security missions, it was normal for the mechanized cavalry groups to be reinforced by a battalion of field artillery, a battalion of tank destroyers and a company of combat engineers.

*Press Branch, War Department Bureau of Public Relations.

V-2---THE "ATOMC AGE" WEAPON



*by Major Hal D. Steward**

5,000-Mile Range Is Goal

A SELF-PROPELLED Atomic Bomb with a 5,000-mile range is the goal of the Army Ordnance Department. Daily at the White Sands Ordnance Proving Grounds in New Mexico, Ordnance experts are working toward the development of such a bomb, which will in all probability prove to be the most potent war weapon in the world.

The Ordnance Department is getting its start on the weapon from captured German V-2 bombs, which at present are self-propelled and have a maximum range of about 200 miles at a velocity of 2,620 feet per second, which is about the speed of a .30 caliber rifle bullet.

By research and development, the Ordnancemen hope to increase the range of this bomb to the previously mentioned 5,000 miles, and load its warhead with atomic explosives. Further hopes of Ordnance experts are that the bomb can be propelled by atomic energy instead of its present fuels of alcohol and liquid oxygen.

When Navy men heard about this potential weapon, one Naval officer remarked, "If this proposed weapon is developed to expectations, the Navy will have to pick up its marbles and go home."

First American Firing of V-2

On April 16, 1946, at White Sands, New Mexico, the first American firing of the German V-2 bomb took place. The firing was reasonably successful despite the fact that one of the bomb's fins fell off a few seconds after it had bolted into the air. The test established the fact that American Army Ordnance personnel are capable of firing the monstrous bomb.

The V-2, which was used by the Germans in the latter stages of the European war, is 46.05 feet long, and weighs 28,380 pounds when fully fueled and loaded. Unloaded it weighs 8,816 pounds. The bomb's diameter is 5 feet, 4.9 inches. In its present stage, the V-2 fully loaded with its 2,200-pound warhead will make a crater in the earth about 35 feet in diameter and 18 feet deep. It can be fired vertically and is capable of reaching an altitude of approximately 100 miles.

A crew of about 28 men is needed to set up and fire the V-2. Two men are required for the firing board; five men on propulsion; seven on the trailer on which the bomb is carried; four on the electrical port; and 10 men to fuel the bomb.

Ninety minutes is required to put the bomb into position and fire it. This also includes prefire testing. For safety, personnel must be at least 100 yards from the bomb when it is fired, but a greater distance is preferable.

In its present stage, the V-2 roughly compares in damage-power with the American 4,000-pound aerial bomb. The weight of the actual explosive in the warhead is 2,200 pounds. The explosive used is Amotol, the same as employed by the American Army.

V-2 is accurate to within 200 yards of a designated target. Its cost is approximately $20,000.

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Range Almost Unlimited

The disadvantage of the bomb at present is its great weight, which is caused by the large amount of fuel it must hold. Until a substitute fuel can be found to propel the bomb, it will be almost impossible to increase its range. Should it be possible to use atomic energy for propulsion as it is hoped, the bomb will have an almost unlimited range.

If it can be propelled by atomic energy, and carries an atomic warhead, the use of aircraft in war would be practically outmoded. It then would be possible to send thousands of these bombs by radio control over a designated target, and maintain an even greater accuracy than is now possible from aircraft.

With such a bomb the only mission ground troops would have is that of occupation.

The United States is not the only country endeavoring to develop this bomb. Most major world powers now are employed in research and development on this "Atomic Age" weapon that has every possibility of becoming the most dangerous war weapon the world has ever seen.

Experiments on the V-2 are being conducted in the middle of the New Mexico desert, 85 miles by road west of El Paso, Texas. The area is level and the small garrison camp can be seen from a distance of 10 miles before it is finally reached. The camp is commanded by Lieutenant Colonel Harold R. Turner, an Ordnance officer with years of engineering experience.

The spot at which the V-2 is actually fired is nearly 10 miles from Colonel Turner's camp. It is known as "The Technical Area," and is encircled by a barbed-wire fence which has armed guards at each entrance. Entrance can be obtained only with a pass signed personally by Colonel Turner.

V-2 Firing Control

Inside the technical area, besides the base from which the V-2 is fired, is a cement blockhouse with walls of cement 10 feet thick, and a ceiling which is 27 feet thick. Inside this concrete house are the electrical instruments that fire the V-2 and control its flight.

Once the bomb is fired its flight is followed by radar units which have been set up at many places on the New Mexico desert. Every effort is made not to lose track of the bomb for one moment while it is in flight. During the first firing test it was possible for the Ordnance technicians to follow the bomb from the time it was fired until it plunged into the ground several seconds later and exploded.

Major Herbert L. Karsch of 2409 South St. Louis Street, Tulsa, Oklahoma, a petroleum engineer in civilian life, has direct charge of the firing of the V-2 bomb. He probably knows more about the V-2 bomb than any other officer in the American Army.

The V-2 is carried and put into firing position by a Mono-wagon, a trailer invented by the Germans which has hydraulic levers that lifts the V-2 into a vertical position.

When a firing of the V-2 is scheduled, Ordnancemen in jeeps warn all the near-by ranchers.

During the next few months several V-2s are to be set off in the New Mexico desert in experiments that may develop the V-2 into the world's most powerful weapon.

And what will be the defense against this weapon? That is anybody's guess. When the author asked one high-ranking antiaircraft officer what would be used as a defense against this potential atomic weapon, his answer was: "That's a good question."

Picture shows Field Marshal Montgomery, bending, with other British officers examining the remains of the jet unit of a V-2 which landed in a field in Belgium. The bomb travels 30 to 60 miles above the earth.

British Official Photo

*Press Branch, War Department Bureau of Public Relations.

Horses Were Used

by Captain Raymond F. Baker

The place–San Stefano.
The date–August 19, 1943.
The event–the formation of a horse reconnaissance troop.

HARDLY had the Sicilian Campaign ended victoriously on August 18, 1943 before Lieutenant General (then Major General) Lucian K. Truscott, Jr., commanding general, Third Infantry Division, directed that all animals which had been gathered by various units of the division for pack transportation during mountainous operations be assembled at San Stefano, Sicily. Mules and horses totalling 120 were collected and three officers and 16 enlisted men were assigned to care for them.

General Truscott issued orders on August 19 creating a mounted reconnaissance troop. An improvised table of organization based upon WD T/O&E 2-17 was used, based on anticipated operations, and equipment that was available. A troop of five officers and 175 enlisted men was authorized. In addition, a mule pack train was to be formed in four platoons of 50 mules each, one officer and five enlisted men per platoon, or a total of four officers and 20 men.

The Third Division was ordered to Trapani for reorganization and training a day later. The mounted elements were assigned an area covering about 10 acres, on which were olive groves and a salt flat that made the location ideal for animal "housekeeping."

Volunteers were called for to form the unit–and one horse-trained cavalryman was found in the entire division. The remainder of the men recruited were from the cowboys, ranchers, city youths and farmers of the infantry, artillery and engineers. Officers were drawn from division units as they could be spared.

Animals were collected from the Italian cavalry stables in Palermo, from farmers and natives who had seized animals abandoned by retreating German and Italian forces, by requisition, and through Allied Military Government facilities. Equipment was gathered from warehouses in Messina, Palermo and Trapani. The only American equipment initially used was 75 Phillips cargo packs, which were flown in from storage in Africa for use by the pack train.

The reconnaissance troop was organized into three reconnaissance platoons and a weapons platoon. Troopers were given their choice of individual weapon–carbine, '03 rifle, or BAR. We finally settled on '03 rifles and four BAR's to a reconnaissance platoon. The weapons platoon carried six light machine guns, two .50 caliber machine guns, and two 60mm mortars. Only one radio was employed–a SCR 284 pack set, hand generated–for communicating with the division headquarters. With the troop, hand and voice signals were used.

(Captain R. W. Baker is an instructor in the Tactics Department of The Cavalry School, Fort Riley, Kansas. He was an enlisted man in the 3d Cavalry Regiment at Ft. Meyer, Va., from 1926 to 1938 and served in Troop F while Lieutenant General (then Captain) Lucian K. Truscott commanded Troop E. Captain Baker was with the 102d Infantry Regiment in Algiers in 1943 when General Truscott called for him to form the mounted elements of the 3d Infantry Division in Sicily. He served through the Italian campaign and later commanded the 3d Division reconnaissance troop in France and German. His article is the first account of the mounted troop's action which has become available from a member of the unit.—Editor's Note.)

Training was hurried. First priority was given to conditioning the men and animals, and teaching the new horsemen the rudiments of equitation and care of their mounts. Cavalry combat tactics were practiced whenever possible. Hasty firing courses were erected along various mountainous routes used in conditioning the men and animals. The troop practiced patrolling the roads and mountain passes. On approaching the target area, platoon and troop attacks were executed. Stream fording, map and compass reading and cross-country movements were practiced constantly. All training was conducted with full field equipment and combat loads. Often the troop remained away from its base

one or two days. By the third week, it was possible to select noncommissioned officers.

The packers, formally called the 3d Provisional Pack Train, were organized into four platoons and were attached to the troop. Personnel learned to pack and adjust loads, and quickly picked up a broad knowledge of the characteristics of mules and their care.

After a month's arduous training in 12- to 16-hour days, the new animal units were tough, and hard. They could move long distances and arrive fit to fight.

The troop, known as the 3d Provisional Reconnaissance Troop, Mounted, to distinguish it from the mechanized reconnaissance troop, was composed of five officers, 126 enlisted men, and 143 horses on September 16. The pack train consisted of four officers, 25 men, and 349 mules. It was decided that until the reconnaissance troop obtained its 50 additional men, the pack train would, in addition to operating the supply train, transport the reconnaissance weapons and equipment so that the riflemen could be at maximum fighting strength.

The organizations loaded into two LSTs at Palermo, Sicily, on September 18, just one month after the activation order was issued. Six inches of sand was spread on the bottoms for stable bedding, and a relay of men sprayed the animals with two-inch fire hoses to keep them comfortable during the hot crossing. We debarked at Battipaglia, Italy, late September 19 and were trucked to an assembly area near Monte Carvino Revello.

Orders were received to organize a mountain artillery battery of four pack 75mm guns. Personnel was furnished by the division artillery battalions, and 125 mules were assigned to the unit, the 3d Provisional Pack Artillery Battery. An original cadre of 16 enlisted horse-and-mule tenders at San Stefano had ballooned into a fair-sized squadron which comprised a powerful and mobile unit for mountain operations.

The first reconnaissance mission was performed on September 21: "Reconnoiter roads lanes and draws approaching Acerno, Italy."

Mines, blown bridges and rugged terrain slowed the advance of the infantry, but proved no barrier to the mounted troop which was able to cut across country at will. The main road, for instance, was so heavily mined for three and a half miles that no vehicle could travel until the engineers cleared the road, an operation which lasted four hours. All avenues were reconnoitered without mishap. Information regarding roads, mountain passes and terrain, and absence of enemy was sent to the division.

The troop then was instructed to reconnoiter hills surrounding Acerno. This assignment consisted of scouring the hill mass beyond town, scouting out draws, possible observation points and likely defensive positions. One of our patrols ran into enemy fire. The troop was immediately organized into a series of strong point positions in order to maintain contact. Several horse-and-foot patrols were sent out to determine the location of the enemy's flanks, his composition and strength. A fairly accurate estimate was made from patrol reports and observers.

Contact was maintained until the arrival of the 1st Battalion, 7th Infantry, which relieved the troop in position. From the information furnished, the battalion was disposed for an attack. The mule pack train swung into action and supplied the infantrymen during a successful three-day engagement.

Mountain operations continued throughout the rest of September, 1943, about four days. Throughout the period, the troop led the infantry regiments on the 39-mile division advance from Acerno, through Montella, Volturara, Atripalda and San Maria. It descended from the mountains only to reconnoiter and pass through the towns of Avellino, Maddaloni, and Caserta.

A breathing spell was afforded at Caserta, when preparations for crossing the Volturno were necessary before a further advance. The time was used in shoeing, caring for animals and equipment, readjusting personnel, weeding out unsuitable animals, and obtaining replacements. By crossing time, the mounted force was in tip-top condition.

Mounted troops crossed the river in the wake of the 15th Infantry at Triflisco, and moved to the town of Villa San Crose, October 13, 1943. The pack artillery went into position as support for operations of the reconnaissance troop. The troop in advance of the 1st Battalion, 7th Infantry, moved toward Marjorano, swung wide of a mountain which it was impossible to climb within the time schedule, and approached Marciano, a small village.

At the edge of town, a stone wall, a stone house and two haystacks in a field was observed–a likely enemy position. Mortar fire that was thrown in ignited one of the haystacks, and stirred up a hornet's nest of enemy, estimated at 75 men armed with machine guns, machine pistols and rifles. Our "peashooting" artillery and the troop riflemen killed 26, wounded five, and captured nine of them. Our losses were one killed and eight wounded. The door now was opened for the infantry to advance to their objective unmolested.

Following this engagement, the troop paced elements of the division to the town of Dragoni. Ordered to the left flank of the division, the troop cut five miles across country to Rocca-Ramona. Upon arrival at posts of observation, the artillery was placed in position to support the troop's attack on the town. Twice the troop went in, and twice it came out. Because of enemy superiority in men and firepower, our force could not hold the town. The 2d Battalion, 15th Infantry, arrived and Major General (then Brigadier) William W. Eagles, commanding the regiment, ordered a coördinated attack. This time the town was held and several counterattacks were repulsed.

The area was now cleared of enemy, and so the troop was ordered into rest for a day at Riardo. Under constant enemy artillery fire, the troop shoed animals and performed other "housekeeping" details attendant to horse operations.

The following day, the troop seized and held Poza, about eight miles away, without encountering the enemy.

From Poza, reconnaissance was pushed west and north. One of the reconnaissance patrols discovered the city of Roccamofina, in British territory, was clear of enemy. A message was dispatched to Teano to the commanding general, 56th British Infantry Division, who expressed thanks for the information. He remarked that he was preparing his artillery and infantry for an attack on the town, and that our reconnaissance information had moved his troops forward one full day.

Poza was soon occupied by troops of the 7th Infantry, and the mounted troop was ordered to seize and hold Toro, eight miles from Poza, and directly across Highway 6 from Presenzano.

We received enemy fire from a stoutly defended road block at the edge of Toro, and because the division had several other routes available that were well inside its zone, we by-passed the resistance and moved to Foresto, less than a mile away, which was not occupied by the enemy. The division commander changed our orders and directed us to occupy Foresto, which was a better location for operations than Toro. Both towns were equal in elevation, and vantage points in Foresto afforded complete observation of Toro and enemy installations beyond.

Reconnaissance patrols and observation posts discovered that the enemy installations were comprised of two self-propelled guns and many dismounted men armed with automatic weapons and rifles, which were located just west of Toro. This information was sent to division headquarters, and the following instructions came back to the troop: Establish radio contact with fire direction center; division artillery and observers from the troop will direct fire; the troop will attack Toro following an artillery preparation.

The attack was successful. Enemy casualties were nine killed and wounded. We captured both self-propelled guns, a variety of small caliber weapons, and rations enough to feed the troop three meals. Following the action, the infantry advanced, and division headquarters moved into Presenzano without interference.

The smoke of this scrap had hardly cleared before the troop was ordered into the hills beyond Presenzano to reconnoiter to Mount Cesimo for the 1st Battalion, 30th Infantry. The troop arrived at the base of the 1,300 meter mountain without trouble, and the battalion commander was informed. He immediately sent his Company C forward to seize and occupy the hill. The company stormed the hill twice and was driven back both times because of enemy superiority in numbers and terrain which favored the defenders.

A coördinated attack was ordered, and while the infantry tried the face again, the mounted troop struck deep on a flank. Our mounted men were able to work more than halfway up the mountain with their horses, zigzagging up rocky trails that were extremely difficult for foot troops. From an overhanging ledge on the forward slope of a ridge on the enemy flank, the troop delivered direct machine-gun fire. Our mortars dropped in rounds from the reverse slope of our ridge. The flank finally softened, and was rolled back before the infantry's frontal attack.

Our next mission was to cross Cannavinelle Mountain and reconnoiter the town of San Pietro. This operation climaxed the career of the mounted reconnaissance troop. Sustained operations, lack of facilities for animal upkeep, and inability of replacements to reach the troop, had cut the strength to 76 fighting men. The movement from Mt. Cesimo to the crest of Cannavinelle was executed rapidly and without contact. Darkness came and the troop secured itself for a quiet night.

But at dawn—and from three sides—a mass of German green-grey studded the landscape. (This was going to be one hell of a scrap.)

The troop was well dispersed and in good defensive positions on an arc resembling an egg-end. The four machine guns were in position to cover the entire field. The mortars, at the bottom of the hill, were ready to deliver surprise fire. All men had good cover and plenty of ammunition. No artillery was available. It was to be a small-arms contest.

The first shot was fired at 0645 hours. About noon, the troop passed from the defense to the attack, and by 1500 hours had captured the hill. The score was 65 enemy killed, 29 wounded, and 11 prisoners "in one piece." Our losses were 11 killed, and 14 wounded, two of whom died. Animal losses were 31 horses and mules.

The town of San Pietro was observed but not entered. With the mission partially accomplished, the infantry took over our positions and we were ordered into a defensive position at Ceppagna.

We were withdrawn for a rest on Armistice Day, November 11, 1943. Eight more days of travel put us in a real rest area where the battle weary troopers were happy over a job well done—59 days of continuous action, except for a day of horseshoeing under artillery fire.

Conclusions

1. Horse cavalry can play an important rôle in mountainous terrain which is unsuited to vehicle operation.

2. Its high degree of cross-country mobility gives a mounted unit freedom of action denied all elements except infantry.

3. Coördinated with infantry, horse cavalry develops a shock power which is difficult to overcome before foot elements apply the battering pressure usually required to subdue a stunned enemy.

4. Italy will sustain mounted operations, although few central grain stock piles can be expected. In rural districts, forage is moderately plentiful.

5. Equipment and supplies, such as saddles and horseshoes, present no problems which can not be easily solved by including animal equipment and supplies in regular quartermaster supply lists.

THE HORSE'S PLACE IN OUR FUTURE

by Colonel Fred W. Koester

Regardless of the extent to which it may figure in our postwar Army, there can be little doubt that the horse will have a definite and important part in the future of our nation. Logical reasoning indicates this—facts prove it.

PARADOXICAL though it may seem, scientific advancement, frequently regarded as the natural enemy of the horse, has, in fact, been responsible for the new and increasing importance assigned this animal. Revolutionary developments in transportation, communication, and other fields have greatly altered world affairs. Nations have been brought much closer together. There is little or no opportunity for isolationism. Wars, instead of being conflicts between two or a small group of nations and confined to rather local theaters, have now become global affairs with all nations directly or indirectly involved. Instead of armies being largely composed of professional soldiers, nowadays everyone, without regard to age, sex, or station, becomes a soldier, actual or potential. If they don't serve on a fighting front, they will likely be engaged on the home front but, in any case, they must be prepared for service.

In such a world, the physical fitness and aptitude of our citizens become of paramount importance. To build and maintain a strong, vigorous, active manhood and womanhood is both a necessity and an obligation. Because it involves our national security, the obligation is properly that of the agency charged with our national defense.

The late war taught us that our average present-day American can stand considerable physical improvement. Modern life with its abundance of luxuries and conveniences is not conducive to physical fitness and ruggedness. Something is necessary to get our people out of automobiles and airplanes, off the city streets, and into the country where they may develop the stamina, self-reliance, and mental alertness that come from spending some time in the open. Now, while no single medium can accomplish this objective, it is certain that none can contribute more to the physical betterment of more people in more localities and under a greater variety of conditions than can the horse.

Why is this true? To begin with, the horse is a great motivating influence. It accounts for a multitude of wholesome sports and recreation such as horse shows, hunting, hunter trials, polo, jumping, schooling, all forms of racing—including harness, flat, steeplechasing, etc., rodeos (which in 1945 ranked third among all amusements in aggregate attendance), trail rides, and a wide variety of other equestrian competitions. These engage or attract people of all ages, both sexes, all colors, all creeds, all stations, and all localities, in all climates, and at all times of the year. It has been conservatively estimated that some 45,000,000 Americans have regular contact with horses, and thus derive some physical betterment or mental relaxation from the association. Our horse "industry" reaches into every state, every county, and every city or hamlet, and has an estimated aggregate value of more than $2,000,000,000. Thus,

there is ample factual basis for emphasizing the importance of the horse to the physical welfare and contentment of a large proportion of our citizens.

There is other concrete evidence too. For example, California, recognizing current horse trends as well as its obligation to its people, recently appropriated $300,000 to begin work on a state-wide trail system, 1,500 miles in length which, when completed, will be without parallel either in this country or abroad. Other states are contemplating similar measures. Again, hundreds of organized horse groups such as sheriffs' posses, riding clubs, city, county and state horsemen's associations and breeder associations, are forming in all parts of the country. It is reported that 52 horse magazines, with national or semi-national circulation, are published in this country. All forms of equestrian sports, most of which were dormant during the war, are returning either in an expanded form or with programs for post-war expansion. Attendance figures at race meetings, rodeos, and other events featuring horses, are breaking all existing records. Prices paid at breeders' sales, etc., are increasing gradually.

These developments have had a decided effect on the horse industry. The riding horse seems to be replacing the draft horse in relative importance. Some fewer but decidedly better horses are being raised. Selective breeding is no longer a goal but an actuality. Standards of horse husbandry have been tremendously improved. The better horses being raised will have a greater all-round utility both for peacetime needs and wartime potentialities. This is of military significance.

Whether we have only a few or no mounted combat elements in our postwar Army, the horse has a definite value as a training adjunct for certain of our military personnel. At some service schools and in some ROTC, National Guard, and other units, horses may be employed profitably. Then, too, we should not lose sight of the fact that Generals Patton, Wainwright, and Truscott; the entire 1st Cavalry Division, and many other illustrious leaders and soldiers of World War II, no matter where or how they fought, were trained in the saddle. A system and a medium that boasts of such products surely must have future value.

The changes which have taken place, as well as the outlook for the future, all enhance the importance of the Remount Service. Originally organized to accomplish necessary procurement as well as administer the Army Horse Breeding Plan, the Remount Service in recent years has become the principal liaison agency between the government and the people of the country in horse matters. As the importance of procurement has decreased, that of breeding has steadily increased.

The Army Horse Breeding Plan inaugurated by a far-seeing Congress in 1921 has made a tremendous contribution to the economic wealth of the country. From a modest beginning of 159 stallions standing in 1921, the number steadily increased until 1942 when more than 700 stallions were in service. Between 1921 and 1944, more than 300,000 mares were bred to Remount stallions and produced over 200,000 foals, most of which, except for normal attrition, are in use in the United States today, principally on ranches and farms and for other essential purposes. These are estimated to have an aggregate value of more than $30,000,000. There are many figures available to prove that the Remount Program has been most economical and has given the taxpayers a maximum return for a minimum expenditure.

The Army Horse Breeding Plan, as well as many other Remount activities, serves a dual purpose. While meeting potential military requirements, it also sustains the quality and quantity of the nation's horse resources. It is directed toward reconciling and integrating our national rural economy with possible future security needs while at the same time, seeking to maintain sound rural economical health and balance as one of our national military resources. It recognizes that horses and mules are a by-product of the ranch and farm as is the development of personnel trained to use them. This is a matter of military importance that should not be overlooked.

The Remount Program, too, takes cognizance of the fact "that the outside of the horse is good for the inside of a man," and that widespread use of horses to add to the pleasure, interest, and above all, physical well-being of our manhood and womanhood is an essential and worth-while step in preserving our manpower resources. Again, the program recognizes that, although the need is diminishing in some fields, there is nevertheless a continuing requirement for horses of suitable type in many phases of agriculture, in our great cattle industry, for use in administering our forests, and in many other essential fields where mechanization cannot, for a variety of reasons, replace the horse.

The Remount Service has an international importance too. First, it is an appropriate agency for coordinating the horse and mule requirements of other nations with our own needs and production capabilities. In this connection, it is well to remember that, regardless of scientific developments in our own country, many foreign nations are geared to an economy based on use of animal power and transport. There is no immediate prospect that they can switch to mechanization either with our help or that of others. Finally, in matters involving the defense of the Western Hemisphere, many military authorities agree that there is and will continue to be at least well into the predictable future, a widespread necessity for horses for military uses in most of South and Central America. The principal source for meeting such requirements is the existing pool of fine horses of military type, largely the products of the Remount Program which exists in the United States today. This supply will continue to exist only if the pool is kept filled by a yearly increment of horses such as resulted and may continue to result from the Army Horse Breeding Plan as now operated.

To the Editor of the CAVALRY JOURNAL:

FROM my seat on the sidelines I hear various and sundry rumors of the merging of the remnants of the Cavalry with the Armored Force to be called perhaps Cavalry or Armored Cavalry.

In view of the widespread misconception of the events which contributed to the establishment of the provisional Armored Force, I believe it is a proper moment to release the historical truth. Here it is in copies of official communications which tell the complete story.

JOHN K. HERR,
Major General, Retired.

322.02

October 3, 1939

Subject: Expansion of Mechanized Cavalry

To: The Chief of Staff

1. In view of my responsibility to advise the Chief of Staff in matters pertaining to Cavalry, the following is submitted.

2. Since the employment of mechanization in Poland apparently has been on mobile, hard-hitting, flanking missions, and in rapid exploitation of the breakthrough created by the assault of infantry and less mobile troops (all typical cavalry missions); and since such similar employment is visualized for any war of movement in this hemisphere, it is believed that any expansion of mobile, fast-moving mechanization should be charged to the Cavalry arm of the service for development and leadership. It is believed that this should begin immediately and center about the 7th Cavalry Brigade, which has already most of the essential elements needed for expansion.

3. *a.* It is therefore recommended that the 7th Cavalry Brigade be expanded into a Mechanized Cavalry Division as indicated in the accompanying organization charts. This expansion more than doubles the striking power of the present brigade by increasing the number of combat cars from 112 to approximately 500, making it fully the equal of the German Armored Division, while at the same time retaining the greater flexibility in organization inherent in the American Brigade (Charts A, A-1, A-2, A-3).

b. First Increment

In order to accomplish the expansion of the mechanized cavalry brigade into a division with a minimum of time, it is recommended that the delivery of vehicular equipment set up in both 1940 and 1941, for the proposed augmentation of the brigade, be advanced so that this equipment will become available in the calendar year 1940 (Chart B).

c. Second Increment

It is also recommended that this office be authorized to submit supplementary estimates for the additional equipment involved in the further expansion of the 7th Cavalry Brigade into a division and that this equipment when authorized, also be given the priority necessary to insure its delivery in the calendar year 1940 (Chart C).

4. As soon as this first Mechanized Cavalry Division shall have been organized with the requisite personnel and material, it is recommended that the organization of another similar mechanized cavalry division be started without delay.

5. Following these two mechanized cavalry divisions, and if it becomes apparent that the Army of the United States is to be increased to the size of four Field Armies or thereabouts for participation in war, it is recommended that two additional mechanized cavalry divisions be authorized so that the resulting proportion will be one mechanized cavalry division to each Field Army. Inasmuch as the training of mechanized cavalry and the procurement of its equipment require considerable time, consideration should be given these last two mechanized cavalry divisions in the initial stages of any planning for a Four Field Army national defense force.

6. *Personnel*

a. As soon as the expansion of the 7th Cavalry Brigade into a division has been approved it is recommended that all necessary personnel for this increment be ordered to Fort Knox, Kentucky, for training.

b. Immediately upon delivery of the equipment for the first Mechanized Cavalry Division, it is recommended that 25% of the personnel necessary for the succeeding division be sent to Fort Knox, Kentucky, for training with the then available equipment, in order to prepare this cadre for the organization of the second mechanized cavalry division in a minimum of time.

c. Upon the authorization of each successive mechanized cavalry division, it is recommended that this same practice be followed; that is, ordering 25% of the personnel of each successive division to Fort Knox, Kentucky, for training as specialists and key men.

d. With reference to this increased personnel for Fort Knox, Kentucky, conference with the Commanding General of the 7th Cavalry Brigade, this date, indicates that facilities exist on that reservation for the initial increase as indicated.

7. The importance of the immediate expansion of mechanized cavalry in the United States Army is indicated by the wide use of German mechanization in Poland. Although the details of this employment are not yet known, it is evident from all reports that German mechanized forces were extensively employed in this rapid and decisive campaign. In view of this fact it is believed that four mechanized cavalry divisons, as

indicated in this project, would provide a reasonable amount of this essential mass of highly mobile, hard-hitting forces in event this country becomes involved in war.

8. The designation of the 7th Cavalry Brigade at Fort Knox, Kentucky, as the nucleus of this expansion is based upon seven years experience in mechanized cavalry at that post.

9. It is recommended that the personnel requirements for this project be considered in any and all progressive augmentations of our ground forces. Inasmuch as mechanization is designed to increase the scope of existing arms and not to replace them it is not considered that personnel should be provided from any existing units of any arm but should be in addition thereto. It is believed that Congress and the American public, when faced with the realization that the United States lags far behind all first-class powers of the world in quantity of mechanization, will be quick to favor any emergency measures necessary immediately to obtain additional personnel as well as equipment for a substantial increase in our mechanized strength. When consideration is given the fact that except for a few scattered tank companies and two or three incomplete battalions, our entire army includes only one mechanized brigade, as contrasted, for example, with at least 10 German armored divisions, the urgency of this situation cannot be escaped.

10. In conclusion, it is believed that existing military thought in the United States with reference to what constitutes the correct proportion of mechanized cavalry in a balanced and mobile force, should now be revised in order to accord this type of cavalry the importance and size it merits.

11. The Commanding General, 7th Cavalry Brigade, has been consulted and concurs in the above. The provisions for the early training of personnel are his specific recommendations and are considered by him to be especially essential for an orderly expansion.

J. K. Herr,
Major General, U. S. Army,
Chief of Cavalry.

(The memorandum of G-3 referred to below asked for comments in the question of establishing an armored corps.)

June 3, 1940

MEMORANDUM FOR THE ASSISTANT CHIEF OF STAFF, G-3

Subject: Mechanization

1. Reference your memorandum of June 1, 1940, on the above subject (C-3/41665), the following comments and recommendations are submitted:

2. *Comments*

a. The present policy of assigning mechanization to the several arms is sound.

b. Lack of funds, not the absence of a separate corps, has delayed the expansion of mechanized units. In this connection attention is invited to my memorandum to the Chief of Staff on October 3, 1939, subject: Expansion of mechanized cavalry (322.02), urging the immediate and orderly expansion of the 7th Cavalry Brigade into a mechanized division of the same approximate power as the German Panzer Division to be followed by the successive formation of three similar divisions.

c. Examination of the employment of German armored divisions both in Poland and France shows clearly that they were used on Cavalry missions, particularly exploitation after the breakthrough. There is no valid reason for setting up a separate corps for the development and training of units to be used in the execution of cavalry missions.

d. The corps reconnaissance regiment, as well as the mechanized cavalry brigade, has been developed by the cavalry, is proving successful, and should remain assigned to that arm.

3. *Recommendations.*

a. That no separate Armored Corps be established.

b. That the 7th Cavalry brigade be designated a mechanized cavalry division and expanded without delay.

c. That additional mechanized cavalry divisions and corps reconnaissance regiments be provided in proportion to successive increases of the army.

J. K. Herr,
Major General, U. S. Army,
Chief of Cavalry.

320.1

December 7, 1940

MEMORANDUM FOR THE ASSISTANT CHIEF OF STAFF, G-3

Subject: Organization of the Armored Force, Your G-3/41668, AG 320.2 (10-2-40), November 19, 1940

1. I do not concur with the recommendations of the Assistant Chief of Staff, G-3.

2. For obvious reasons my remarks will be confined to his recommendation that the Armored Force be established as a separate arm of the service without further delay. As a basis for my conclusions and recommendations, I will review the facts bearing on this situation in chronological sequence.

3. In the report of the Chief of Staff, U. S. Army, 1932, the following broad policies governing the development of mechanization in the Army were announced as follows: "Every arm is authorized to conduct research and experimentation with the view of increasing its own power to perform properly the missions it has been especially organized and developed to carry out. Every part of the Army will adopt mechanization and motorization as far as practicable and desirable." In conformity with this policy the Cavalry first set up one mechanized cavalry regiment, which was later extended into the 7th Cavalry Brigade, Mechanized, composed of two mechanized cavalry regiments, with the necessary staff, headquarters unit, and attached supporting arms, including artillery.

4. Continuing this sound development step by step the Chief of Cavalry on July 8, 1937, recommended the formation of a cavalry division, mechanized. This was approved by the War Department for planning purposes only; that is, it was regarded as a paper organization and no equipment was authorized. This status continued until 1939, when the present Chief of Cavalry in the hearings before the War Department Budget Advisory Committee on the equipment to be procured in 1940 asked for all the matériel and equipment necessary to increase the 7th Cavalry Brigade, Mechanized, to the division strength of about 3,000 set forth in the organization approved for planning purposes, amended by conference and concurrence with the Commanding General, 7th Cavalry Brigade. This request was supported by the fact that the then Chief of Staff had stated before Congressional committees that this brigade would be increased to a division. The Budget Advisory Committee was about to approve the estimate when the following development threatened to sabotage the project.

5. The Assistant Chief of Staff, G-3, having submitted a memorandum to the Chief of Staff, recommending approval in principle of the expansion of the 7th Cavalry Brigade, Mechanized, into a mechanized cavalry division along the lines previously indicated, informed the Chief of Cavalry as follows:

May 12, 1939

MEMORANDUM FROM THE A.C. OF S., G-3

Subject: Mechanized Cavalry Division (G-3/6541-Cav-36, May 2, 1939)

The Chief of Staff disapproved the action recommended in the memorandum cited above, which is returned herewith. The Chief of Staff is opposed to further expansion of the mechanized brigade into a mechanized division, and desires that any planning towards further expansion of mechanized units be along the lines of an additional brigade in general similar to the present 7th Cavalry Brigade.

By direction of the Chief of Staff:

(s) H. R. Bull,
Lt. Col., General Staff
Secretary, General Staff.

6. As a consequence of this the Assistant Chief of Staff, G-4, informed the Chief of Cavalry that, inasmuch as the Chief of Staff had disapproved the formation of a mechanized division, the matériel and equipment asked for by the Chief of Cavalry to equip the division would not be approved by the Budget Advisory Committee. The Chief of Cavalry then, by personal interview with the Chief of Staff, obtained the concession that he really wanted all this equipment no matter what the development might be. By personal interviews with the Assistant Chief of Staff, G-4, and the Assistant Chief of Staff, G-3, after stating the view of the Chief of Staff, the Chief of Cavalry was able to save this equipment which finally passed, not only the War Department Budget Advisory Committee, but the Bureau of the Budget. This equipment was the first equipment available in the present expansion and would not have been available except for the efforts of the Chief of Cavalry.

7. The next step to further the development of mechanized cavalry was the result of European developments in mechanization as shown in combat. Beginning in 1938, when he came into office, the Chief of Cavalry had initiated an intensive study of all European mechanization. He had requested and secured from the Assistant Chief of Staff, G-2, up-to-date summaries of the mechanization of all leading powers. In addition, he had submitted questionnaires which were sent to military attaches to secure data to fill in the gaps. This included every phase of mechanization; organization, training, equipment, armor, armament, and everything that could be learned. The organization of the Panzer Division was studied in the most complete detail. The Chief of Cavalry had also secured the detail in his office of officers from mechanized cavalry who were completely familiar with all the details of mechanization and training in the 7th Cavalry Brigade. One of these officers had been the brigade executive and G-3 for the preceding three years and had written every problem executed by this force. Complete files were set up and kept up to date. In the summer of 1939, the Chief of Cavalry called into conference with him the Assistant Chief of Staff, G-3, and Colonel Truman Smith of G-2, who was intimately familiar with the details of German organization, and endeavored to inform thoroughly the new Assistant Chief of Staff, G-3, as to the organization and purposes of the German Panzer Divisions and to sell him the idea that there was a great likelihood, in view of the international conditions, that this country in any expansion of our forces, would need American mechanized divisions more or less similar to the German Panzer Division. It was also impressed upon the Assistant Chief of Staff, G-3, that these divisions were really armored cavalry and that any development in our Army of such mechanized elements should naturally and properly be under the supervision of the Chief of Cavalry. He appeared to concur.

8. Immediately after the Polish campaign, the Chief of Cavalry, on October 3, 1939, submitted to the Chief of Staff a memorandum, subject: Expansion of Mechanized Cavalry, copy of which is attached hereto, and marked Incl. No. 1. It will be noted that, in this recommendation, the Chief of Cavalry proposed that the deliveries of all equipment for a division of 3,000 men scheduled for 1940-1941 delivery be speeded up for de-

livery in 1940, that he be permitted to submit supplementary estimates for additional equipment necessary to increase the 7th Cavalry Brigade into a division of the approximate strength of the German Panzer Division of about 10,000 men, and that it be given the priority necessary to assure its delivery in the calendar year 1940. Complete charts of recommended organization accompanied this memorandum.

9. It was recommended also that, as soon as the first mechanized cavalry division had been organized with the requisite personnel and matériel, the organization of another similar mechanized cavalry division be started without delay; that following the organization of these two mechanized cavalry divisions, if it became apparent that the Army of the United States was to be increased to the size of four field armies, two additional mechanized cavalry divisions be organized so that the resulting proportion would be one mechanized cavalry division to each field army; and that, inasmuch as training of mechanized cavalry and procurement of its equipment required considerable time, consideration should be given the last two mechanized divisions in the initial stages of any planning for a four field army national defense force. It further stated that the missions of this force were typical cavalry missions and that any such expansion should be charged to the cavalry arm of the service for development and leadership. It also stated: "It is believed that Congress and the American public, when faced with the realization that the United States lags far behind all first-class powers of the world in quantity of mechanization, will be quick to favor any emergency measures necessary immediately to obtain additional personnel, as well as equipment for a substantial increase in our mechanized strength. When consideration is given the fact that, except for a few scattered tank companies and two or three incomplete battalions, our entire army includes only one mechanized brigade, as contrasted with at least 10 German armored divisions, for example, the urgency of this situation cannot be escaped."

10. This was the first concrete recommendation made by anyone, so far as I know, for the establishment of American divisions of this type. No one in the 7th Cavalry Brigade had suggested anything of the sort and were still thinking in terms of the small division of about 3,000 men. It so happened that General Chaffee, then in command of the 7th Cavalry Brigade, was in Washington at the time. This memorandum, with its accompanying tables, had been completed and he was requested by the Chief of Cavalry to confer with him and express his concurrence or dissent. After suggesting one or two very minor alterations, he agreed to concur and the Chief of Cavalry so stated in the last paragraph of his memorandum.

11. Immediately after the submission of this memorandum of October 3, 1939, there began an attempt to prevent the Cavalry from securing control of this development. Although there may have been some who honestly believed in a separate armored force, it is believed that the bulk of this agitation was on the part of those non-cavalrymen, some of whom had served in tank battalions, who saw themselves excluded from gaining high positions in armored corps and divisions. A whispering campaign was begun to the effect that the Chief of Cavalry, being an ardent horseman, would not develop mechanization. As has been shown hereinbefore, there was no foundation in fact to these whisperings. Meanwhile, no official recognition was given to the far-reaching recommendations made by the Chief of Cavalry in the memorandum of October 3, 1939. On the contrary, the G-3 section of the General Staff began to pester the Chief of Cavalry with memoranda requiring him to state where he was going to get the personnel to man the mechanized equipment which was coming up in 1940 and prescribed the restriction that he must get this personnel from the strength which he then had. In other words the idea was to force the break-up of horse regiments to man the very equipment salvaged by the personal intervention of the Chief of Cavalry. Inasmuch as the Chief of Cavalry could see the need in the near future for all the horse cavalry he then had, plus considerably more, in addition to a great expansion in armored cavalry, he resisted this rather petty effort of trying to force him to rob Peter to pay Paul. (See attached copy of memorandum of Chief of Cavalry to the Chief of Staff, April 10, 1940, and marked Incl. No. 2.)

12. Meanwhile, although a separate armored force had been rejected by the War Department on previous occasions, the proponents of a separate force continued to agitate this matter. This apparently came to a focus at the close of the maneuvers in Louisiana in May 1940. Both the Chief of Infantry and the Chief of Cavalry attended these maneuvers. The Assistant Chief of Staff, G-3, failed to invite them to attend a conference which he called to consider the subject of mechanization and to which he invited a few officers of more or less experience in tank battalions and in mechanized brigade.

13. Immediately thereafter in a memorandum of June 1, 1940, the Assistant Chief of Staff, G-3, to the Chiefs of Cavalry and Infantry, subject: Mechanization, copy of which is hereto attached, marked Incl. No. 3, requested their views on a change in the present policy of mechanization, particularly as to the advisability of setting up a separate armored force. Both the Chief of Cavalry and the Chief of Infantry declared themselves to be opposed to a separate armored force. Attached hereto is a copy of the memorandum of the Chief of Cavalry, marked Incl. No. 4. Following are extracts of the report from the Chief of Infantry.

> "The Panzer units are in effect armored cavalry. The Chief of Infantry urgently recommends that no precipitate action be taken in this matter, but that all aspects be given careful consideration. The fallacy of shaping organization on the basis of weapons, rather than adapting weapons to the mission, is a constantly recurring one. It was seen in the World War in the machine-gun corps of the British Army, which a large group in the American Army wanted to adopt for our service. The present basic policy of tank development was laid down by General MacArthur in his memorandum of May 1, 1931. It was one of the soundest documents ever promulgated by the War Department. It lays down the principle that development of weapons and units should be based on mission."

14. I quote also a paragraph from confidential letter to the War Department, dated September 15, 1939, from the Commanding General, 7th Cavalry Brigade, subject: Some Observations and Recommendations Pertinent to Any Future Expansion and Development of Mechanized Cavalry which may be Contemplated by the War Department, as follows:

> "To me, the basic determination of the War Department to develop the mobile mechanization as cavalry and with cavalry conception and leadership, and to develop the immediate tank assistance to assaulting infantry as infantry and by the infantry tank service—which basic determination was confirmed by the Gruber study in G-3 of the War Department—has been again shown, both by the Plattsburg maneuvers and by the German operations in Poland, to be an essentially sound solution under our law and should be continued."

15. On June 5, 1940, in a memorandum to the Chief of Staff, subject: Expansion of Mechanized Cavalry, the Chief of Cavalry renewed his recommendations of October 3, 1939. Copy of this memorandum is hereto attached and marked Incl. No. 5.

16. On June 5, 1940, the Assistant Chief of Staff, G-3, in a memorandum to the Chief of Staff requested that the following named officers be ordered to Washington and report to the Chief of Staff for consultation in connection with organization matters pertaining to mechanization: Brigadier General Adna R. Chaffee, Brigadier General Bruce Magruder, Brigadier General C. L. Scott, and Lieutenant Colonel S. E. Brett. The last named officer announced to all before leaving Fort Leavenworth that he was going to Washington to advocate a separate armored corps.

17. On June 7, 1940, the Assistant Chief of Staff, G-3, issued a memorandum calling for a conference on June 10, 1940, at 10 A.M., of chiefs of general staff sections, arms and services on the subject of armored equipment and organization in the Army. Generals Chaffee, Scott and Magruder and Lieutenant Colonel Brett were present. When this conference was called the Assistant Chief of Staff, G-3, stated that the discussion was wide open, except on one point; i.e., that the Chief of Staff had decided that two divisions would be formed, one at Benning and one at Knox, utilizing the mechanized elements of both Cavalry and Infantry for this purpose. In the ensuing discussion the Chief of Cavalry again expressed himself as being opposed to a separate armored force, stating that the present policy was a sound one, that is, permitting each arm to develop its own mechanization to execute its mission; that there was no doubt the missions of the Panzer divisions were cavalry missions; that he was in no struggle for power, but that the question seemed to be largely whether fast-moving mechanization would be dominated, as in the German Panzer Corps, by men of cavalry training, or whether it would be submerged by having in key positions men of other branches; and that he was aware of certain conspirators, some of them in the General Staff, who had been working all along for a separate armored force chiefly as a means to their own advancement. Lieutenant Colonel Brett was the only one present who directly declared for a separate armored corps. This meeting was adjourned to meet in the afternoon. Word was sent around that it would not meet that afternoon, but some time later when notice would be given. Insofar as the Chief of Cavalry and the Chief of Infantry were concerned no additional meeting was ever held. I happen to know, however, that the four representatives of the 7th Cavalry Brigade and of the tank units who were present at the first conference were called together in a series of meetings and discussions in secret conclaves with the Assistant Chief of Staff, G-3, at which time they apparently wrote their own ticket for the formation of an armored force to be set up as an experimental field organization.

18. On July 10, 1940, a memorandum was issued by The Adjutant General, subject: Organization of the Armored Force, which not only set up an experimental field force of one armored corps, but allotted to the Chief of the Armored Force and the Commander of the Armored Corps practically all the duties of a chief of branch.

19. On July 10, 1940, the memorandum of the Chief of Cavalry to the Chief of Staff (copy hereto attached marked Incl. No. 3), dated June 5, 1940, subject: Expansion of Mechanized Cavalry, hereinbefore mentioned and repeating the recommendation of the memorandum of the Chief of Cavalry to the Chief of Staff, October 3, 1939, was returned by 1st Indorsement as follows:

> 1st Ind.
>
> "AG 320.2 (6-5-40)
> M Ret C
>
> War Department, A.G.O., July 10, 1940—To: Chief of Cavalry
>
> In general, the recommendation of the Chief of Cavalry have been incorporated in the Armored Division organization.
>
> By order of the Secretary of War:
> Adjutant General."

20. Thus after more than nine months of delay in a critical world situation the Chief of Cavalry was notified that an armored force was being set up to try to accom-

plish in frantic haste practically the same objective that had been recommended on October 3, 1939, by the Chief of Cavalry to be accomplished in a sane, orderly, and constructive manner.

21. The Assistant Chief of Staff, G-3, now recommends in this basic paper that, because he believes this force has admirably fulfilled its mission of initial organization and has successfully passed through the experimental stages of its existence, in the interest of efficiency it should be legally established as a separate arm of the service. There appears to be nothing in the accomplishments of the Armored Force as such including the establishment of a Force Headquarters, a liaison officer in Washington, a school, a board, and a replacement center, which, given the necessary funds, personnel, and matériel, could not have been accomplished equally well or better through the established agencies of the War Department.

22. So far as the tactical units of the Armored Force are concerned, the armored divisions have not been completely equipped nor have the individual soldiers been fully trained. Least of all have the divisions progressed to the point where they can be tested by exercises and maneuvers to determine whether or not the equipment and organization are satisfactory. I have grave doubts as to whether the changes in armor and armament in the light tank have improved these vehicles for employment as armored cavalry. The light tank of the Panzer division weighs 7½ to 9½ tons. The heaviest armor of this type tank does not exceed 4/5 of an inch. Our light tank, as modified, now weighs 13½ tons, armor thickness 1 to 1½ inches. The German medium tank varies in weight from 20 to 22 tons. The thickest armor is 1 3/5" and varies to ¾ of an inch. Our present medium tank, as modified, has a weight of 25 tons and armor thickness of 1½ to 2 inches. The proportion of light to medium tanks in the Panzer corps is three to one. The proportion of light to medium tanks in the American corps is a little more than two to one. It has been claimed that the present American light tank is too heavily armored for its present chassis. Other criticisms have been made. It is very unlikely that the American armored division is as mobile as the Panzer division, chiefly because of the heavier weight of the tanks. It is a matter of grave doubt that it will be sufficiently mobile to execute cavalry missions on this continent and in this hemisphere. Before it can be said that this force has successfully passed through the experimental stage of its existence it would seem that all these matters should be thoroughly examined.

23. The Assistant Chief of Staff, G-3, also states that, while the chief of the Armored Force is charged with all the functions of a chief of arm, he is handicapped in the performance of his duties by not having full authority vested in the chief of an arm by the National Defense Act. This is a plain admission that a separate arm has already been set up, without the sanction of the law, or rather by evasion of the law, because the intent of the National Defense Act is to set the metes and bounds of the organization of the Army of the United States and any wide departure therefrom should obviously first receive sanction by legislation.

24. There appear to be two specific violations of the provisions of the National Defense Act: First, that part of Section XVII which states, "Hereafter all tank units shall form a part of the Infantry," Second, that provision of Section XVIII which states that "the enlisted men of the cavalry shall be organized into cavalry units as the President may direct." The two cavalry regiments were organized into two light armored regiments.

25. *Conclusion:* There is no need for an armored force as a separate arm of the Service.

26. *Recommendation:* Before any final decision is made in this matter a more thorough review should be made concerning the progress of the armored force under present direction, to include extensive exercises and maneuvers over all kinds of varied terrain after the armored divisions are presumed to be adequately trained and equipped.

J. K. Herr,
Major General, U. S. Army,
Chief of Cavalry.

* * *

To Former Members of the Armed Service

Quite often we receive letters from our former subscribers telling us that they are now separated from the service and asking if they can still subscribe to the Journal.

Yes, indeed you can. Any civilian can subscribe to the Cavalry Journal. The only difference is that you are not a member of the U. S. Cavalry Associaton, and, therefore, not entitled to a vote in the affairs of the association.

All you have to do is send us your home address, and we will do the rest.

* * *

This issue of The Cavalry Journal goes to press with the name of one of its highly esteemed staff members, Mrs. Evelyn S. Drayton, Book Editor, missing from the masthead.

Mrs. Drayton resigned her position with the Journal early in April, after having served it for several years with: a "military rating of superior." Her new position is with the Army Institute of Pathology, Washington. Her place on the staff is being filled by Mrs. Elizabeth C. Hoover.

Mrs. Drayton was devotedly loyal to the Journal. To her the magazine not only came first, it *was* first —and she was steadfast toward both those ends. In the performance of her tasks, which besides the book editorship included sundry others requiring a meticulous attention, her work was excellent.

For her, in behalf of ourselves and our subscribers whom she served in many ways, we will always wish the very best.

OTHER BRANCHES

Signal Corps Photo

General Jacob L. Devers

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From the Marine Corps

Every great soldier must be an expert in his own specialty—cavalry, artillery, armor, infantry, engineer, or any of the services or combat arms — and have a full, useful knowledge of the other combat arms and services.

The knowledge alone is not enough. It must be up-to-date, and his thinking must be progressive. He must be able to project his plans beyond today's knowledge. He must anticipate, if he is to contribute his full worth to security of our nation.

Consequently, a step like "Other Branches" is a step in the right direction—giving knowledge of other arms and services to our modern soldiers. It can only be as good as its research and contributors. It deserves our hearty and active support —and it will merit our regular reading.

Jacob L. Devers
Commanding General,
Army Ground Forces.

THE AMERICAN INFANTRY-ARMOR TEAM

by Major General John W. O'Daniel
Commandant, Infantry School

Signal Corps Photo

With smoke from blasted German armor filling the sky, American Doughboys follow their armor on the road to Fontainebleau just before the liberation of Paris.

WHEN the European war started in 1939 there is little doubt that the Germans had the most advanced picture of the capabilities of armored forces. The German General Guderian was the leader of world military thought on this subject, with the British General J. F. C. Fuller a close second.

The armies which followed the Guderian teachings did so blindly and rigidly. This blind faith was undoubtedly increased by the astonishing initial successes of his theories.

The German habit of doing things by rote and lack of flexibility worked heavily to their detriment as allied countermeasures came closer to providing an effective answer to the German tank theory. Over long periods the losses the Germans suffered continued to be almost net losses—so many tanks, so many men, so much tactical or strategic advantage.

Our army, on the other hand, from Tunisia to Okinawa, took its losses thinkingly. Against those losses they usually could make a credit entry—"This thing we have learned; next time we will do this." And the losses saved by this open-mindedness and mental flexibility may well have overbalanced those we suffered in learning lessons.

Infantry and armor finished the war with an ability to coöperate which was almost unbelievable to those who had opportunity to see how deficient they were in this respect in the early stages of the war.

That deficiency, which characterized the non-armored infantry divisions and the independent armored battalions, was due primarily to a lack of material for proper combined training of the two arms. It did exist, however, and caused us losses. Tunisia for instance, still furnishes sad and bitter memories to many.

It is a primary responsibility of those charged with the training of these two closely related and highly interdependent arms, that this same defect does not exist should we be faced with a future war.

Amazing Mental Flexibility

In studying the factors affecting future training at The Infantry School a most encouraging one stands out prominently in the experience reports available. That factor is the amazing mental flexibility of the American soldier and the speed and relative ease with which he was able to abandon any preconceived ideas he might have had and adopt new ones to fit the situation at hand.

He fought each battle as he came to it. When the methods he had been taught failed to work he experimented. When his experiments were successful he adopted them as tentative SOP. He unhesitatingly discarded those experiments which didn't work, and just as unhesitatingly modified those which would work when new conditions made them of doubtful value.

When an army of seven million men is built around a nucleus of less than 200,000, it is obvious that the small unit leadership is going to be in the hands of those who are not highly educated from a military point of view and who have few, if any, fixed ideas.

These men depended upon fundamentals, faced the issue as it existed, and made their decisions on the basis of cold fact, leavened with imagination and their compelling desire to save the lives of those who trusted and followed them. This freshness of viewpoint was tempered and kept within the bounds of military soundness by experienced supervision.

When our armor began to see action in North Africa in late 1942 and early 1943, there were widely divergent opinions regarding its capabilities and the proper methods of using it. The German successes in Europe and North Africa had led many to feel that the tank had become king of the battlefield, and the Doughboy was relegated to semi-service duties of cleaning up and holding. We had developed the tank destroyer to combat the hostile giant of the battlefield and, in our enthusiasm, had even tentatively conceived for it the mission of running down enemy tanks and destroying them.

Armor Not Sufficient In Itself

We paid heavily in lives and in material to learn that armor, like every other arm, is not sufficient unto itself but must work with other arms not only for its own security but to achieve maximum results from combat.

Beginning in North Africa and continuing through Sicily, Italy, Europe, and the islands of the Pacific, we began to appreciate some of the problems presented by the ever-increasing closeness of the wedding of infantry and armor, and we began to solve those problems on the spur of the moment—and, more often than not, to solve them successfully.

None of those problems is yet completely solved. However, real progress has been made on many of them, and on others sufficient progress has been made to know that the problem exists, which is always a step forward.

Some of the solutions of the various problems which were adopted in combat are given below in quotations from or paraphrases of reports received from the various theaters. Though one unit is usually cited as the authority in each case, the same method frequently was employed by many other units.

The basic problem was the need for mutual understanding and confidence of infantry and armor, which are the real comrades of the battlefield. They must meet the enemy face to face and work together to destroy him.

In Africa, Sicily, and for some time in Italy and Europe, came recurring complaints from the infantry that the tanks had "failed to show up," had "pulled out when the going got tough." At the same time, tankers were making similar complaints about the Doughboy—"They wait for us to win the fight and then they walk up" . . . "They don't take out the antitank guns because the AT guns do not shoot at infantry." Various steps were taken to eliminate these misunderstandings. In Europe it became SOP to attach a tank battalion and a tank destroyer battalion to each division, and the same subordinate units of these attached armored units were ordinarily allotted to the same regiment so that they became acquainted and the mutual confidence grew by leaps and bounds. A number of units—the 175th Infantry was one—gave as many of its infantry as possible a ride in a buttoned-up tank. This not only familiarized the Doughboy with the difficulties of the tanker but gave him a much better realization of the limited vision and field of fire, and tended to reduce his fear of hostile armor. The same methods were used by the 307th Infantry in the Pacific Theater.

Errors—and SOP

Various expedients were adopted to reduce the need for withdrawal of tanks for refueling and resupply. In the hedgerow fighting in Normandy many tank battalions, including the 741st, adopted the practice of using tanks in double teams of two tanks each. The two leading tanks would furnish the infantry support until fuel or ammunition needed replenishing. When these withdrew they would be immediately replaced by the two tanks in rear. This system was kept up in many units throughout the European campaign. It was SOP for town and village fighting with the 736th Tank Battalion as well as with many others. In the Pacific, similar steps were taken.

In the 149th Infantry in the Pacific it was SOP for the infantry company commander and the tank platoon leader to make their initial reconnaissance together and to stay together during the operation.

One of the early errors that led to misunderstanding was commented on in a report from the 7th Armored Group in Europe during late September 1944. The comment told of the failure of infantry commanders to include in their staff conferences and in planning, the commanders of the attached tank units. The result, according to the report, was the assignment of unsuitable tasks to the tanks, and the loss of mutual confidence. It is significant that the last such report noted from the European Theater was made in mid-October 1944 by the XX Corps.

The infantryman's feeling of responsibility for protection of his accompanying armor increased by leaps and bounds. This was probably due to the somewhat selfish knowledge that if he lost one of his tanks he lost a powerful battlefield aid. Whatever the cause, this protection was SOP in all theaters within a short time after the first joint fighting of the two arms. The 1st Marine Division worked out an SOP during the Okinawa campaign. This provided that, when working in rubble or high vegetation, three or four infantrymen would accompany each tank and furnish protection from all sides against suicide attacks or close range antitank weapons; in relatively open country the infantry would furnish the same type of protection by following the tank closely enough to insure visibility—seldom more distant than 300 yards; in

canyons and valleys, specific infantry units were designated to take positions along the sides or crest to secure the advance of the tanks.

The extent to which the various expedients adopted to increase mutual confidence succeeded was well exemplified by a statement made by an officer of the 3d Infantry Division toward the close of the campaign. He was asked his opinion of the relative merits of the various tank battalions then doing duty in the Sixth Corps, to which the division belonged. He listed a number of the battalions in the order of his opinion of their efficiency. His questioner then remarked:

"Funny you didn't include the 756th" (the battalion which had been attached to the 3d Division for some time).

"Oh!" he replied hastily. "That's a part of the division. They don't come any better than that."

Communications A Major Problem

A second major problem, closely related to that of mutual confidence, was that of communications. Within a few days of the landing in Normandy it was general practice to fasten to the outside of a tank a telephone hooked into the tank's intercommunication system. This practice in various forms was continued until the end of the campaign and was also used in the Pacific. Other communication expedients adopted were: the 116th Infantry furnished the tanks with SCR 300 radios which were kept tuned in to the infantry battalion channel; the 761st Tank Battalion sent a liaison officer in a half-track equipped with an SCR 508 radio to infantry regimental headquarters; in the 16th Infantry when the tanks were moving ahead of the infantry, one tank was held back to permit the infantry commander to communicate with the tanks and when the two were together, the infantry company commander would ride in the tank with the tank platoon leader; units of the 6th Army in the Pacific used sound powered telephones in their tanks with about 50 feet of wire run out through the turret ventilator or the pistol port; the 330th Infantry installed SCR 536 radios in the tanks, removing a bolt and running the antenna, previously insulated, through the hole thus made.

Some of the most astonishing variations were observed in the proportions of the two arms allotted for the accomplishment of various missions.

During the early fighting in the Siegfried Line, the Third Armored Group, composed of the 741st and 747th Tank Battalions, was attached to the 28th Infantry Division to constitute a task force with the mission of widening the gap in the German defenses. Initially, German resistance was disorganized and spotty, and considerable success was obtained with a force in which the tanks predominated, with just enough infantry to occupy strategic pillboxes and hold the ground gained. After two or three days the enemy increased his mine defenses and brought in large numbers of panzerfausts and other antitank weapons. The force began to suffer tank losses. The tank and infantry commanders immediately got together, changed their organization and relative strength, and resumed their advance successfully.

The allotment of tanks to infantry varied from as much as battalion for battalion in some stiff fighting in Europe to the allotment of single tanks to infantry companies in the Pacific.

The tankers did not hesitate to abandon their theories of mass use of tanks where the situation required. This was particularly noticeable during the hedgerow fighting in Europe. There, more than a platoon of tanks seldom worked as a unit, and frequently two tanks would be attached to or would support an infantry platoon.

We have seen at what cost the lesson was learned that tanks must be employed with infantry support. But even that costly lesson was calmly tossed overboard by the 67th Armored Regiment shortly before the crossing of the Rhine. Several unsuccessful attacks had been made upon a hostile position which could be reached only across 3,000 yards of open ground. It was finally decided to make an old-fashioned cavalry charge. Two medium tank companies, one light tank company, and an armored infantry company were employed. Supported by artillery, the light tank company moved out first, at about 35 miles per hour. The mediums followed at a slower rate and the armored infantry, on foot, followed these. The position was captured with negligible loss of lives and tanks.

Obviously, there were dangers. There might have been tank traps or mine fields. Reconnaissance to locate them was made. The commander decided it was time to take a chance and employ mass. He was successful.

Battlefield Stories

Here is a story from the commander of Combat Command A, Fourth Armored Division: "To capture a bridge we approach it indirectly over secondary roads. The artillery places time fire on the bridge in order to prevent its destruction by the enemy. We move in fast under this time fire with our tanks followed by the infantry in half-tracks. One company of infantry is given the mission of seizing the bridge. The artillery forward observer moves with it. The engineers follow to search for wires and demolition charges. The infantry advances very close behind the time fire. We have had a few wounded by our own fire, but we feel the losses would have been greater with a different procedure and that this method is sound."

Tactical ideas and suggestions flowed in from both infantry and tank commanders throughout the European campaign where the number of tanks was far greater than in any other theater.

The 116th Infantry worked with tanks almost throughout the campaign and contributed a number of ideas. Here is a quotation from a member of that unit, made while the fighting was still at its height:

"Where practicable, we have the infantry and tanks attack from different directions. If we can't, we usually let the infantry follow the tanks at from 100 to 150 yards. The tanks are deployed in depth and all are firing; if the infantry were mixed in with them, they would be in danger from our own fire. As the tanks close on the objective they cease firing and the infantry passes through. Thereafter, the tanks fire only on call or on close and unmistakable targets."

This is from the same regiment during the pursuit phase: "When we make a breakthrough, the leading infantry company is loaded onto the tanks, except for one squad which is put on the vehicles of a platoon of the division reconnaissance troop. The reconnaissance platoon then reconnoiters to the front, closely followed by the tanks with infantry riders."

There was considerable discussion and experimentation in connection with the method of movement of infantry accompanied by tanks.

One of the most novel methods tried was based upon an infantry carrier called "Battle Sled," which was developed by the 3d Infantry Division at Anzio, Italy. Each sled carried one man. Twelve sleds were arranged in two columns of six each and were towed by a tank. The sleds were of armor plate and their use permitted keeping the infantrymen close behind the tank, with a measure of protection from enemy machine-gun fire and ready for instant action.

The commander of the 22d Infantry, 4th Division, was completely sold on the idea of riding his Doughboys on tanks and cited these as some of its advantages:

The infantry is above hostile machine-gun fire, and it offers a more fleeting target and gets some protection from the tank turret; the infantrymen are in good position to toss grenades into foxholes, to protect the tanks from bazooka and AT grenade fire, and to provide better observation for the tank crews; it crosses up the Germans, who teach their men to shoot the infantry following the tanks; when antitank guns are encountered, the infantry can dismount, deploy and knock them out. He cited among the problems involved, the partial disruption of command and staff organization, and the loss of the fire of infantry supporting weapons which could not well be similarly transported.

The 51st Armored Infantry frequently put its Doughboys on tanks but left them off the two lead tanks to reduce losses. They used this method particularly when the action was fast, and when moving through towns against spotty opposition.

Some armored infantry units used their half-tracks to transport infantry only when no opposition was expected. The 35th Tank Battalion, however, when in action with infantry, preferred to have its infantry in half-tracks because of the additional armor protection, which reduced the likelihood of losses from our own time fire. The 110th Infantry, which preferred a similar system, also pointed out that it kept the infantry squads intact and provided some additional safety because the half-tracks could be maneuvered to take advantage of the tank as a cover from small-arms fire.

Our soldiers refused to accept as gospel the dictum that tanks are helpless at night. The 357th Infantry in Europe used to have tanks follow a night attack primarily for the purpose of meeting the anticipated daylight counterattack, but secondarily for their powerful morale effect.

The 3d Infantry Division reported the use of searchlights for illumination of night operations. One platoon of searchlights provided enough light for night operations of an infantry regiment supported by armor. This system was used extensively by the division in the fighting in the Colmar pocket near Neuf Brisac in January 1945.

In the Pacific, the 775th Tank Battalion, harassed by infiltration of the perimeter by night, equipped some of its tanks with spotlights which could be aimed and operated by hand, and spotted them along the outer perimeter. When a noise was heard, the near-by infantry was alerted and the spotlight flashed in the direction. Time after time the Japs were "caught flat-footed and shot before they knew what was happening."

One of the pet aversions of the tanker—wooded country—was the subject of report after report. Our tankers just wouldn't accept any theory that they were useless in any situation.

Here are some experiences on tank operations in woods:

"We have our light tanks follow the infantry to each phase line," said an officer of the 774th Tank Battalion, "one tank section to each infantry assault company. Mine removers follow just behind the infantry and clear paths for the tanks. The infantry checks all clearings for antitank gun positions. When the infantry is stopped, the tanks come forward and spray the opposition until it is reduced."

The Fourth Division, after considerable experience, arrived at the conclusion that the light tank was better for close support in woods than the medium. The 314th Infantry, however, used its mediums to good effect in woods, particularly where hostile tanks were a part of the defense. These hostile tanks would usually be dug-in and practically immune to our tank destroyer fire. This problem was solved by blinding the hostile tanks with smoke from 81mm mortars. This necessitated movement by the hostile tanks to a position from which they could see—but from which they were now vulnerable to our tanks and tank destroyers.

Another subject of frequent report from units in the European Theater was joint tactics of infantry and armor in town and village fighting. Here are some highlights, the source being indicated after each.

"Our practice is to let the infantry enter the town while the tanks move to the flanks and rear to destroy the enemy as we flush him out. When the town is captured, the tanks move immediately to the outskirts to provide protection until the tank destroyers come up."

—116th Infantry.

"For each infantry platoon, we provide two tanks in support and two in reserve when moving through a town. The leading tanks are relieved by the reserve tanks when about half of their ammunition is exhausted. They take position in reserve and refill when the opportunity offers. In this way, continuous support is provided and all tanks are available for an emergency when any emergency is likely."—736th Tank Battalion.

"We assign one tank to fire on the lower floors and one on the upper stories. They fire on prearranged signals from the infantry."—377th Infantry.

"Where streets are wide enough, we have two tanks move abreast, each firing on the opposite side of the street. With this method, the tanks do not have a blind side as when they operate singly."—48th Tank Battalion.

"Our tanks start firing at the lower floor and work up. This either forces the enemy into the basement where the infantry can trap him, or drives him progressively up until our fire catches him."—750th Tank Battalion.

"When it is necessary for our tanks to work one to a street, we assign four infantrymen to protect each tank against short range antitank fire."—26th Infantry.

In the Pacific there were repeated instances of taking tanks where they "couldn't go" with astonishing results. Here is a quotation from the commanding officer of the 13th Armored Group on Luzon:

"In difficult country it took tremendous effort to get tanks up the steep slopes to the Japanese defensive positions. But the effort was well worth while. Often even one tank was of powerful assistance, partly because of the surprise. We also found that usually the Japs had prepared no antitank defenses in such locations."

By the close of the European campaign many units had adopted a fairly complete SOP for joint operations of infantry and armor. There are some noteworthy features in this extract from a report by the 612th TD Battalion.

"Before bringing forward the tank destroyers, the infantry would clear the mines on the route, prepare defensive positions, usually using shell or bomb craters as the start, compute ranges and provide guides. Our movement into position was screened by smoke. When the tank destroyers opened fire, the infantry mortars also opened with high explosive for the double purpose of confusing the enemy and keeping him down. When our mission was accomplished, our withdrawal also was screened by smoke."

Innumerable expedients were adopted. Most of them were made on the spur of the moment and many of them showed considerable ingenuity.

A number of units obtained forward observation for artillery fire from officers and noncommissioned officers of front-line tank units. The 229th Field Artillery Battalion made it a practice to place an artillery observer in one forward tank of each of the tank supporting elements.

Tanks were frequently used to bring forward supplies to the infantry where conditions made it impracticable to bring them forward by wheeled transportation.

In the 66th Armored Regiment a number of tanks were equipped with racks on the rear, permitting the evacuation of three wounded on each tank.

Beginning with the first joint operations in Normandy and continuing throughout the campaign, emergency supplies for the infantry were carried on the outside of the tanks fighting with them. This made the supplies readily available in combat, and tended to promote the feeling of comradeship and mutual confidence which grew amazingly during the campaign.

It will be noted that, in the examples given, solutions of the same problem were frequently widely divergent and, at times, almost diametrically opposed. At times they were in violation of what was our teaching. These are presented not with any idea of indorsing them as future doctrine, but rather with the idea of exemplifying the ingenuity and mental freedom of the American.

We, who bear the responsibility for the training of our basic fighting team of the future—infantry, armor, artillery and air—must do certain things.

Our training must keep abreast of new ideas.

We must study those ideas from every angle and try them in every way until we know what the effect will be—how best we can exploit their use.

We must foster and encourage in every possible way the spirit of comradeship and mutual confidence between these arms. To this end peacetime dispositions and training plans should insure that infantry tanks and armored reconnaissance units (and of course the always indispensable artillery) train together.

It is not the job of the infantryman or the tanker to worry yet about the effect of the atomic bomb on any future warfare, or about any of the other things that are hailed as presaging a revolution in combat methods. We must, rather, take our stand on the firm foundation that the infantry-tank team, reinforced by the powerful assistance of air and artillery, is the most potent fighting combination that ground combat has yet known.

Our job is to increase the power of this combination to the limit.

Above all, we must encourage and develop that quality in the American soldier which is a part of and peculiar to our way of life, the independent and challenging spirit which accepts nothing as final but always poses the question "Is there a better way to do it?"

Signal Equipment and the Armored Forces

by Major General H. C. Ingles
Chief Signal Officer

THE use of radio equipment in armored vehicles during World War I was not extensive compared with modern standards. Radio and automotive armored vehicles were relatively new and there was no working background to form a basis for their coördinated use.

As a rule, small field radio sets were mounted in the vehicles and operated on frequencies which embraced the present commercial broadcast band, and a few hundred kilocycles above it. These frequencies were strongly affected by man-made interference and by atmospheric electricity.

Comparatively little was known about antenna requirements in those days, and the range of vehicular radio was curtailed since the short antennas used could not function efficiently on the relatively long wave lengths (medium frequencies) then in use.

It was almost a decade after the war before appreciable progress was made in designing radio equipment for use in armored vehicles, rather than merely adapting existing equipment to such use. Within two more years, a tank set had been developed and tested in the 3,000 to 4,800 kilocycle band. Reception was good on CW, ICW and voice over a range of three-quarters of a mile.

Shortly after this country's entry into World War II, this range had been increased more than 3,000 per cent.

Supplying communications equipment for armored force vehicles presented a number of problems not encountered, or met only to a lesser degree, in designing other signal corps apparatus.

Space was restricted and the equipment had to be compact. The vehicles were highly mobile; it therefore was necessary that the equipment be capable of functioning whether or not the vehicle was in motion as well as affording communication range over appreciable distances. The vehicles traveled over rough terrain—some were amphibious; the equipment had to be engineered to withstand violent road shock, and shock mountings were needed. The vehicles were used in all theaters and the communications equipment had to perform in the zero temperatures of the sub-arctic and in the heat and humidity of the tropics. Vehicles were made in a wide variety of types, necessitating various means of mounting radio sets and their components.

In addition, antennas were required to fit the conformation of the vehicles and to match the input and output impedances of the receivers and transmitters. As armored vehicles are sources of both electrical and mechanical noise, it was necessary to devise means of avoiding or minimizing the effects of electrical noise through the use of suppression systems and set design, and new microphones and headsets were developed to overcome difficulties caused by mechanical noise.

The radio set SCR-506 as installed in the right hull bulge in the light armored car, M8. This photograph was taken from the driver's position.

Signal Corps Photo

The first development work on a radio set designed especially for use in armored vehicles was the conversion of the transmitter of a radio set formerly used in day bombers (the SCR-134) to vehicular installation. For use in tanks, this transmitter was combined with the receiver from a cavalry pack set, the SCR-163. The latter provided 10-mile phone and 30-mile CW range. These equipments gradually evolved into the Radio Set SCR-193 which was in use during the early months of World War II.

As early as 1930, tests were made with equipment which incorporated an interphone to permit communications between members of the tank crew under the conditions of high mechanical noise encountered within tanks. An "antinoise" microphone—the early forerunner of the noise-cancelling lip microphone T-45—was found to afford much better communication than standard radio-telephone microphones.

Antennas had posed a problem from the very first. It was necessary to establish a compromise between mechanical strength and suitable electrical characteristics. Many types were considered: a condenser (capacity) type consisting of a metal plate supported several inches from the tank hull, a piece of heavy pipe bolted to the top and rear of the tank, a trailing antenna, and a loop antenna mounted on the tail of the tank. However, despite the likelihood of damage from overhanging branches, enemy fire and other hazards, the conventional fish-pole antenna was soon found to be the most practical. It was developed in 1930 and, with many improvements, has remained in use ever since.

Tests were conducted in 1931, using the then standard ground set, SCR-136, the two-pack set, SCR-163, and a newer set—SCR-189—which had been developed especially for tank use. In addition there was a receiver for installation in tanks which might be "dumb" but not "deaf," the SCR-190. Each of these sets was powered, at least in part, by batteries external to the electrical system of the vehicle.

Later developments were Radio Sets SCR-209 (a transmitter and receiver) and SCR-210 (receiver only). These formed the groundwork for the development in 1936, of Radio Set SCR-245, one of the best-liked armored force sets in the early years of the war.

In these early days, armor was known as mechanized cavalry. As it assumed greater importance, becoming the armored forces, the necessity of providing improved radio equipment became manifest. In 1940, a program for the provision of special sets was undertaken to meet military characteristics supplied by the Armored Force Board. These characteristics resulted finally in the production of Radio Sets SCR-506, SCR-508, SCR-509, SCR-510, SCR-528, SCR-538, and such accessory equipments as Interphone Equipment RC-99 and Interphone Extension Kit RC-298.

Radio Set SCR-506 is used for communication in command and administrative radio nets. It uses amplitude modulation, the transmitter providing 126 channels from 2.0 to 4.5 mc, and the receiver covering 2.0 to 6.0 mc. It was available for use with either a 12-volt or 24-volt power supply, and was designed for installation in various tanks, armored cars, half-tracks and other vehicles, either alone or in combination with other vehicular sets.

Radio sets SCR-508, SCR-528 and SCR-538 are similarly designed for operation on 12 or 24 volts, and for a wide range of installations in armored or other vehicles. The SCR-508 includes two Radio Receivers BC-603, and one Radio Transmitter BC-604 (which incorporates an interphone amplifier). SCR-528 is the same, except that only one radio receiver is included. SCR-539 has one receiver and no transmitter, the interphone requirements being provided by Interphone Amplifier BC-605. These sets, providing 80-channels in the 20.0 to 27.9 mc band, are of the frequency modulated type, affording voice communication over a 10-mile radius when moving or a 15-mile radius when stationary, even in areas where the electrical noise level is high.

Radio Sets SCR-509 and SCR-510 are also frequency modulated equipments; the former is a portable set powered by dry cell batteries, the latter a similar vehicular set operating from a 6-, 12-, or 24-volt dc source. Each transmits on two pre-set channels in the same band as the SCR-508/528/538 series, affording a five-mile range with voice communication.

As none of these sets netted with infantry equipment, two other radio sets were employed to facilitate tank-infantry cooperation. Upon occasion, Radio Set SCR-536 (the "handie-talkie") was taken into the tank, for communication between the armor and the infantry which supported, or was supported by it. The SCR-300 (the "walkie-talkie") was similarly used, and formed the basis for a new equipment: Radio Set AN/VRC-3. This set included the Transmitter-Receiver BC-1000 of the SCR-300, with a special antenna, tower supply, and other accessories to suit it to vehicular use. Like the SCR-300, the AN/VRC-3 was frequency modulated, with a range of three miles on voice in the 40.0 to 48.0 mc band.

To permit conversation between the members of the crews of tanks and other armored vehicles, Interphone Equipment RC-99 was provided. This was employed in conjunction with radio sets that did not include interphone, and in vehicles not radio-equipped.

Interphone Extension Kit RC-298 was used to afford telephonic communication from persons outside the tank to those inside. It consisted essentially of a handset mounted in a metal box on the tail of the tank and connected to the interphone system of the tank. When the tank was halted, or moving slowly, persons external to the tank were able to take the handset and talk to the crew. When tanks were emplaced, a remote field Telephone EE-8 could be connected to terminals provided in the external box.

Although the frequency modulated radio equipment designed for the armored forces was relatively free from the electrical interference created by the vehicles, further measures were taken to minimize this noise as much as possible. Not only were the sets carefully shielded, but the ignition systems of the vehicles were shielded and (or) suppressed. It was found that wheel and track static might be minimized by the employment of conductive rubber for tank treads and the like. These measures, together with bonding to keep all portions of the vehicle at the same potential, kept such interference at a minimum.

Mechanical noise was overcome by means of specially designed microphones and headsets. Microphone T-45 incorporated a diaphragm, both faces of which were exposed to ambient noise, striking both faces simultaneously, little or no diaphragm motion was caused by the noise sound waves. As the microphone was suspended on the upper lip of the user, his voice struck one face with far more force than the other, thus providing a signal.

Mechanical noise was prevented from interfering excessively with reception through the use of Headset H-16/U. This consisted of a pair of large ear cups, made of soft rubber where they contacted the wearer's head, and of steel on the outside to afford protection. In the base of each cup was a matching transformer and a phone unit of the hearing aid type, the output of which was fed to the user's ear through a metal tube and a soft rubber ear insert. The double seal (insert to ear orifice, and cup to head) cut out a large percentage of the ambient mechanical noise.

In addition to radio communication equipment, the armored forces were provided with cloth panels for use in identifying themselves to friendly aircraft in the daytime, and high intensity signal lamps for a similar function at night.

The armored forces' use of signal equipment was by no means limited to the items especially designed for them, for higher echelons employed all the wire, high power radio, radio relay, teletype and similar systems which were used by similar commands. The extent to which such equipment served can be judged from the records of the 146th Armored Signal Company, which served with the 6th Armored Division from Normandy through Brest and the Battle of the Bulge, all the way to the Mittweida, in Germany.

During the period from July 18, 1944, to May 8, 1945, the message center of this company handled 152,340 messages, of which about one-fourth were forward and three-fourths to the rear. It is estimated that 14 ¼-ton vehicles traveled a total of 208,544 miles to accomplish this.

Some 1,385 miles of telephone wire were laid during this period, and 3,508 teletype messages were handled. Six CW radio nets operated with net control stations located at division headquarters, including one station always in the Corps' Command net. From July 27, 1944, to May 8, 1945, these stations transmitted a total of 3,414 messages, representing 117,594 groups. It has been estimated that approximately six times as many messages were received as were transmitted. These figures do not include some 20 other CW radio nets operating within the units of the division.

The signal corps equipment supplied to this single armored signal company during the July 18, 1944-May 8, 1945, period included:

Antennas	292	Radio Set SCR-300	26
Batteries	88,894	SCR-506	18
Converter M-209	82	SCR-508	56
Cords	2,412	SCR-509	4
Crystals, sets	150	SCR-510	220
Dynamotors	84	SCR-511	31
Flashlights	2,789	SCR-528	51
Fuses	490	SCR-536	127
Handsets	260	SCR-538	10
Headsets	906	SCR-593	10
Mast bases	467	SCR-608	7
Mast Sections	4,944	SCR-610	13
Microphones	1,182	SCR-694	19
Mountings	75	Radio Receivers	100
Panel Sets	6,045	Transmitters	195
Telephone EE-8	577	Tubes	17,631
Wire, miles	6,162	Detector Set SCR-625	——

The above figures do not include radio sets drawn through ordnance channels with replacement vehicles, nor the individual items on the parts lists of complete radio sets.

The performance of the equipment supplied to the armored forces by the signal corps may best be appreciated by a study of the reports from using organizations. The following are typical:

"Armored force Sets SCR-508, 528, 538 and SCR-509 and 510 have become the backbone of communication within the armored division. The inherent advantages of FM (frequency modulation) in overcoming static and ignition interference and in giving a clear voice signal of sufficient quality and volume to be heard over the noise of tank operation, have fully justified the additional complications of design and manufacture. The flexibility of operation, combined with the accuracy of crystal control, have made this series of sets the easiest sets there are to operate."—Letter from Colonel Grant A. Williams to Office of the Chief Signal Officer, March 18, 1944.

"Lt. Col. Wyndham, Signal Officer, First British Armored Division, said of the SCR-508, 'I like it. It's better than anything we have. I like its compactness.'"

"The Facsimile Equipment RC-58 is one of the most valuable improvements received to date. We have 15 sets operating continuously, and no real difficulties have been encountered once the equipment was installed."—Lieutenant Colonel H. C. Williams (with 1st Armored Division), December 29, 1944.

Perhaps it would be well to conclude this article with an extract from the report of the 141st Armored Signal Company from June 18, 1940, to May 20, 1943:

"All radios were working excellently and communications were the finest to be had."

Combat Engineering--
Lingayen to Manila*

by

Lieutenant Colonel James B. Lampert

Corps of Engineers

THE XIV Corps of the Sixth U. S. Army landed on northwestern Luzon in the Philippines on January 9, 1945, then marched and fought its way 120 miles to enter Manila in 26 days, and had cleared the city of Japanese by March 3. As in every other operation of the war, Combat Engineers were there all the way.

The Sixth Army made its landing with the I and XIV Corps on Lingayen Gulf. Its mission was to seize a beachhead in the Lingayen–Damortis–San Fernando (La Union) areas, and subsequently seize the Central Plains–Manila area by overland operations. Each Corps consisted of two divisions and supporting troops. A fifth division was in reserve. Lt. Gen. O. W. Griswold's XIV Corps, composed of the 37th and 40th Infantry Divisions, landed on the beach between the towns of Lingayen and Binmaley.

Operation In Three Phases

I Corps, on the left, encountered stiff resistance, and was forced into a hard, slow advance into the mountains and hills to the east and north. XIV Corps landed almost unopposed, and exploited its landing with vigor. The result was an operation in three phases:

a. A speedy, relatively easy, advance over open terrain to the Fort Stotsenburg Area, where stiff resistance in the hills on the west was cleaned out by the 40th Division only after bitter fighting lasting several weeks.

b. A sidestepping by the remainder of the Corps around Stotsenburg, and a resumption of the drive into the outskirts of Manila, over numerous streams where all bridges had been destroyed and against constantly increasing resistance. The newly arrived 1st Cavalry Division joined the Corps in this phase and formed the left of the two-pronged advance.

c. A month of bitter fighting through the streets and from house-to-house to clear Manila of last-ditch enemy resistance which caused high casualties among our troops. In this phase the Corps was reinforced by the 11th Airborne Division, under control of Eighth Army, which had landed near Nasugbu, south of Manila Bay and forced a rapid entrance into Manila from the south.

Combat engineer missions in the first two phases were almost exclusively stream crossings. The third phase brought the Corps into heavily mined and barricaded areas, and the engineer troops put much of their effort on these. Engineers of the 4th Special Brigade operated the corps beaches at Lingayen. Army engineers, including aviation battalions, often were near the front, both in support of the tactical mission and on high priority logistical projects requiring early completion. This article covers only operations of engineers under XIV Corps, omitting the fine record of these other units.

Plans for the Landing

Local planning for the Lingayen landings began in August of 1944. The Corps Engineer was a member of a planning party under the Chief of Staff, XIV Corps, which spent about a month at GHQ in Brisbane. Final planning was conducted and completed at the Corps G.P. at Bougainville, Solomon Islands. The 37th Division and the bulk of the corps troops were at Bougainville; the 40th Division was at Cape Gloucester, New Britain.

Extensive terrain studies, aerial photographs, and maps of the beach area were available to the Corps Engineer. Two considerations governed engineer planning:

a. The XIV Corps landing beach was backed by a delta area crisscrossed by streams, estuaries, fish ponds, and rice paddies. The most important stream was the Colmay River. In effect the initial landing area was an island, and several successive stream crossings had to be made to debouch from it into the higher terrain of the northern Central Plains. The only safe tactical assumption was that all bridges would be destroyed by the enemy. (See Figure 1.)

b. Only two main roads led south in the corps sector. Assignment of one road to each division as a main supply road was obviously the only solution for the planned advance toward Manila.

*The Military Engineer.

The restricted amount of usable land in the delta area, and the extensive plans for early landing of troops and supplies, as well as for immediate development by Army of the Lingayen Airfield, required that the tactical troops clear the area and seize terrain to the south, without delay, to give themselves "room to fight."

Based on these considerations, plans were adopted for division and corps engineers to land by means of assault shipping enough bridging material to open the two axial roads for required loads without dependence on material from other sources. By a compromise between the desired and the available, the final plans provided this bridging composed of prefabricated timber trestle, three units of Bailey bridge, and the M-3 material of the light ponton company. Sixth Army promised additional bridging on Army-controlled ships to follow immediately.

Less concern existed over the engineer problem south of the Colmay Delta. This stage of the campaign could develop along any of several different lines, and detailed planning had to await development. Supply of materials after the assault stage was an Army responsibility.

Intelligence data indicated few underwater and beach obstacles, and the landing plans assigned to the Navy the primary task of removing any which might be found. Engineer demolition parties were organized, and accompanied the advance waves to reinforce the naval parties, if required, but prelanding reconnaissance confirmed our information. No obstacles were encountered.

Engineer troops assigned to the Corps were the 1129th Combat Group, 131st Combat Battalion, 1279th Combat Battalion, and five separate companies: topographic, maintenance, light ponton, water supply, and camouflage. The group headquarters and two battalions had been with XIV Corps through the New Georgia and Bougainville operations. In a theater accustomed to a paucity of engineers, this troop list was almost utopian.

The engineers on Bougainville were relieved from operational duties just prior to departure for Luzon, but they managed to sandwich in some good training, obtained full replacements, and were in good order when the loading-out time came. One weakness was that none of these units, long overseas, had seen a Bailey bridge until late November. Later results showed up this weakness.

Engineer supply before the operation posed two main jobs: replacing old equipment and finding enough bridging. The equipment arrived, but every commander and supply officer aged ten years trying to get it. Bridging was provided by working every possible source. When bridge timber imports failed to materialize, engineer sawmills on Bougainville milled enough native timber for 1,500 lineal feet of 35-ton trestle bridge; this, late, was worth its weight in paper pesos. To complicate the supply picture, Bougainville having been part of the South Pacific Command, the troops coming from

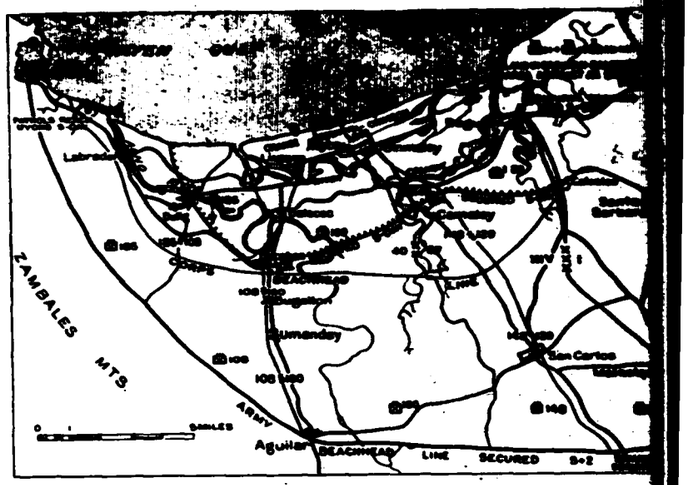


Figure 1. XIV Corps landing operations.

there drew their supplies from that command; the troops at Cape Gloucester drew on Southwest Pacific supply bases.

As in all amphibious operations, the provided ships lacked the capacity to carry all the matériel on hand. Engineer equipment was given preferential treatment to meet the anticipated problem of egress from the Colmay River delta at Lingayen, but equipment and supplies whose lack was sorely felt were dropped back to later shipping echelons. The 1279th Combat Battalion moved by administrative shipping from Bougainville to Cape Gloucester in November, and there was attached to the 40th Division for the voyage north. What could not be squeezed into the ships was left in rear echelons at Bougainville and Cape Gloucester, and shipped to Luzon during the succeeding five months. XIV Corps shipping left Bougainville and Cape Gloucester in December, rendezvoused off Huon Gulf, New Guinea, and moved north via Manus in the Admiralty Islands.

The Advance

Both divisions advanced rapidly after the assault waves reached the beach. In the 37th Division sector, the 117th Engineers of the Division came ashore attached to regimental combat teams and reverted to battalion control on S-Day plus 2. Using mobile-loaded bridge timbers, they bridged two small streams between the beach and the Colmay River. Infantry crossed the Colmay on S-Day in amphibious tractors and LCMs which came upstream from the sea. The highway bridge near Binmaley, a Howe-type steel truss, with one span dropped into the river, comprised the first obstacle. The 117th Engineers laid a plank treadway to pass jeeps over the top chord members of the dropped span, and followed this with a 120-foot double-double

Bailey bridge. Heavy surf at the beaches delayed unloading, and construction of the bridge was slowed until enough Bailey parts came ashore and were hauled to the bridge site. The 131st Engineer Battalion, which had landed with the 37th Division beginning on S-Day completed the bridge.

Four miles farther south toward San Carlos, no additional floating or Bailey bridging having yet come ashore, the 117th Engineers constructed a 120-foot timber trestle bridge over a tidal stream with a soft bottom, in thirty hours. This bridge passed twenty-one medium tanks in two hours, plus the bulk of the traffic of division headquarters and one RCT, before the bents, as expected, began to settle unevenly. The 131st Engineers by this time had procured more Bailey material at the beach and launched a Bailey bridge over the trestle structure, which adequately carried all remaining loads.

Another RCT advanced south on the parallel road Dagupan—Malasiqui, supported by a company of the 117th Engineers. Several small streams were crossed by a variety of measures. Destroyed bridges were repaired by pioneer methods, one ferry was installed using pneumatic floats and bridge timber brought ashore by the division engineers on S-Day, and on occasions Filipinos built footbridges of bamboo, lashed together with grass.

The 40th Division, moving south and west from Lingayen, was faced at once by two large streams, the Basina and the Agno. Assault troops went over in LCMs, Amphtracs, assault boats, Filipino dugout canoes, and Infantry support rafts. Both streams were deep, tidal, and over 500 feet wide. Permanent bridges had been destroyed twice, by the retreating Americans in 1941 and again by the Japanese in 1945. Floating bridge equipage did not become available until S plus 4. At that time the 556th Heavy Ponton Battalion (a newly arrived Sixth Army unit) threw a steel treadway bridge over the Basina, and the 530th Light Ponton Company under the 1129th Group installed an M3 Light ponton bridge over the Agno. The road was opened to division loads on S plus 7.

The Group Commander had placed the 1279th Combat Battalion in support of the 40th Division. This unit landed on S plus 2 and thereafter worked in close liaison with the Division Engineer, Commanding Officer of the 115th Engineers.

South of the line Aguilar—San Carlos—Malasiqui, the terrain is rolling, relatively high, and cut by small streams. The divisions drove south on parallel roads to the Clark Field—Fort Stotsenburg area (see Figure 2), and engineer support followed a definite pattern. Division engineers built hasty by-passes around destroyed bridges by bulldozing earth fills across streams, using wooden culverts or short trestle bridge sections on the larger streams. The corps battalions followed closely behind, taking over each project from the division engineers as rapidly as possible, completing and

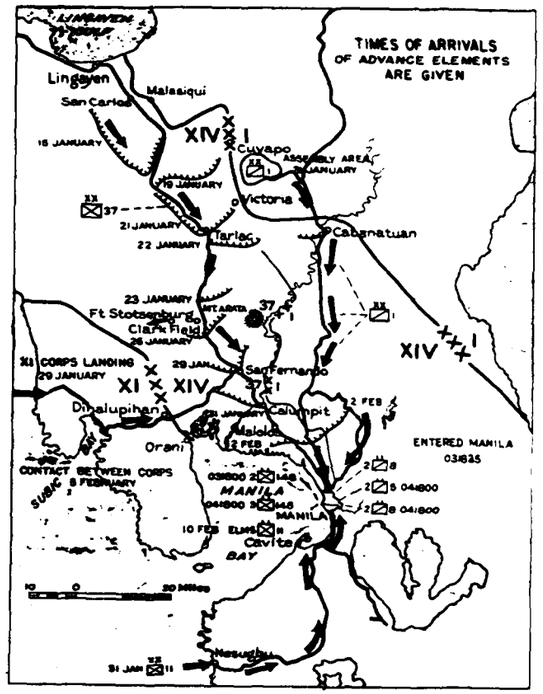


Figure 2. Routes of advance to Manila.

improving it for corps loads, and then, in turn, handing it over to Army engineer units in the rear. This system could have succeeded only in the dry seasons, when all watercourses were at lowest stages. Two crossings of the Agno in the 37th Division Sector were made by heavy ponton bridges constructed by the 556th Heavy Ponton Battalion.

In the Clark Field—Fort Stotsenburg area our troops encountered the enemy in force. The 40th Division swung to the east to clear the area and the surrounding Zambales foothills. The result was a tedious drive into a rugged, heavily fortified area where advance was measured by the number of cave defenses knocked out. The 115th Engineers found their load lightened with the slower advance. They were employed mainly on construction of temporary "jeep" supply roads into the foothills, and on removal of minefields. Meanwhile the Corps, now strengthened with the 1st Cavalry Division, pushed on to Manila.

Drive to Manila

The 1st Cavalry Division, attacking south from the Cabanatuan area along Highway 5, made its now-famous dash into Manila. By speed and by skillful use of sideroads and fords, its advance elements brushed aside scattered opposition and reached Manila without being delayed by destroyed bridges. The 8th Engineer

Squadron of the Division sent mobile-loaded bulldozers and bridge timber with the leading elements, and provided an adequate crossing or detour at every stream. The 131st Engineers, less one company, were placed in support of the division on January 29, and, to quote the battalion commander, "spent most of their time trying to keep up." The route was over good roads, and the seizure of a large number of bridges before the Japs could destroy them eased the engineer task.

The 37th Division, and the bulk of the corps troops moved on Manila via San Fernando, along Highway 3, designated the corps axial road. Here also a rapid advance brought about the capture intact of several bridges south of San Fernando. However, American strategic bombing in the preceding months had destroyed the bridges on three major streams near Calumpit, of widths ranging from 250 feet up to 600 feet. Assault troops crossed these streams in amphtracs, assault boats, and on light ponton rafts. Heavier traffic, including vitally needed artillery and tanks, was stalled.

This nut was the hardest to crack of any between Lingayen and Manila. New floating equipage on ships anchored off the Lingayen beaches was delayed in coming ashore by unloading priorities. The advance had left the engineer dumps far behind. Much of the equipage already on shore was installed over streams to the rear. The nut cracked by working on every possible solution. The Army, Corps and Division Engineers maintained almost continuous telephone connections among all their offices. At Lingayen, a cargo of treadway bridge was unloaded at once. The 556th Heavy Ponton Battalion (Sixth Army) bridged the 250-foot stream at Calumpit with a 25-ton ponton bridge and the 600-foot Pampanga River was spanned with a M2 steel treadway bridge. The 1279th Engineers replaced three demolished spans in the third bridge with 80-, 90- and 100-foot Bailey spans. The S-4 section of the 1129th Group pooled all available cargo trucks and ran a continuous motor-freight service, hauling bridge material 80 miles from the Lingayen beach dumps direct to the sites. Initially the treadway material was insufficient to bridge the Pampanga; the 530th Light Ponton Company finished the job with M3 light ponton equipage, successfully improvising a floating joint between the two types of bridge. Three combat companies from the 131st and 1279th Engineers reinforced the ponton units for the work. And no one in the division and corps engineers went to bed for 72 hours. The bridges were open on the third day.

Japs Destroy All Bridges

Meanwhile the 37th Division continued on to Manila. In the final 30 miles were six or seven streams, averaging 150 feet wide. Capitalizing on the delay near Calumpit, the Japanese had destroyed all of the bridges. From February 3-6, the 530th Light Ponton Company was in close support of the 37th Division. Its light equipage bridged or provided ferries across each stream. One critical day all the 105mm howitzers of the division successfully crossed two streams on infantry support bridges, whose rated capacity is only a 2½-ton truck. M3 light ponton equipment was used on two streams. As before, the corps combat battalions, supported by Army heavy ponton units, followed the advance elements. Bailey bridge, hauled by truck from the Lingayen area, was used wherever it was possible; steel treadway was thrown across two sites. By evening of February 7, all traffic was moving directly into northern Manila. In seven days, using material transported an average of 100 miles, a light ponton company, two heavy ponton companies, and the equivalent of five combat companies drawn from three battalions had constructed 2,100 feet of 35-ton floating and Bailey bridge.

During the month ending with the drive into Manila, perhaps 80 per cent of all combat engineer effort was spent on getting the divisions over streams. Other tasks, of course, were continuous. One Corps combat engineer company landed on S-Day, with three bulldozers, and helped construct positions for the antiaircraft artillery with the Corps. This attachment was terminated after four days, when our overwhelming air superiority and movement of the Corps south from the beach supply areas indicated the improbability thereafter of serious enemy air attacks.

Road maintenance by corps engineers was secondary. The rate of advance prevented anything but filling pot holes and hasty grading. Dry weather was on our side, and the comparatively good network of prewar highways carried all corps loads without any failures. What had been a major problem for engineers in the rains of the Leyte campaign was a comparatively routine task on Luzon.

Our drive met the first obstacles in the Clark Field area, mostly crudely placed fields of hastily buried aerial bombs, plus some improvised wooden box and "yardstick" mines. Engineers of both divisions and from the two corps combat battalions, materially assisted by ordnance bomb disposal teams, cleared these fields. Detection was easy because of poor concealment.

Engineers were not used as infantry but they habitually provided security for their own work parties.

The separate engineer companies with the Corps worked with distinction at their assigned jobs. The work of the light ponton company has been discussed. The 1520th Water Supply Company, two platoons landing S-Day, established water points in close support of the two divisions, and moved often to keep its supply sources well forward. The survey platoon of the 670th Topographic Company was attached to the Corps Artillery, which had no organic artillery survey elements. They continued this mission throughout the campaign. The balance of the company, landing on S-Day plus two, remained mobile until the advance passed Tarlac. It then established itself in that town and printed maps and map substitutes round-the-clock for XIV Corps and Sixth Army.

Capture of Manila

The flames of burning Manila lighted the sky every night of the week before we drove into the city. The awful destruction, the bitter Japanese stand in the most modern part of the city until the beautiful government buildings and the historic Intramuras were battered down on the last enemy, are familiar stories now. The engineer share in the capture of Manila was two-fold: crossing the Pasig River and clearing the heavily mined streets.

That half of Manila north of the Pasig was captured quickly. On February 6, the 37th and 1st Cavalry Divisions stood all along the northern bank. The 11th Airborne Division entering southern Manila after its rapidly exploited landing south of Manila Bay, passed to XIV Corps control on February 10. To cut off enemy escape to the east, and clear the city, the three divisions were ordered to converge on the main enemy force in the modern business and government district south of the Pasig.

The 148th Infantry (37th Division) crossed the Pasig on February 7 near the Presidential Palace, in 30 assault boats manned by the men of the 117th Engineers. Five waves were crossed, all but the first under intense enemy small-arms, mortar, and medium artillery fire. Infantry support rafts propelled by outboard motors, followed up and supplemented the assault boat crossing. The following day, the 530th Engineers moved their M3 equipage to the area, and, after several delays because of hostile fire, threw across a 350-foot bridge in seven hours, completing it at midnight. This bridge site was under fire for several days, but constant maintenance kept it open, and it supplied the 37th Division advance for three days. Army engineers, procuring equipage as fast as it came ashore at Lingayen, constructed an M3 steel treadway bridge with the assistance of the 1279th Engineers, which eased the traffic load.

Two miles upstream, on February 9, the 8th Engineers ferried assault waves of the 8th Cavalry across the Pasig against light opposition, and maintained ferries for two days until completion of a 260-foot M3 steel treadway bridge by the 556th Heavy Ponton Battalion, assisted by the 1279th Engineers.

In the final assault on the Intramuras (walled city) on February 23, one of the three simultaneous attacks was an assault crossing of the Pasig by the 129th Infantry (37th Division) in assault boats manned by the 117th and 530th Engineers. Thanks to the artillery preparation and the vigorous land attacks on two other sides of the Intramuras, this crossing was completed without opposition.

The enemy subjected the Pasig bridges to intermittent fire for two weeks. Several hits occurred, but repairs were always completed without serious delays. Japanese suicide demolition detachments twice approached bridges at night in small boats. Each time they were fired on by the bridge guards, their demolition cargoes detonated, and the parties were effectively destroyed.

Japs Use Expedient Mines

Minefields, infrequently encountered in outlying sections of Manila, were the major hazard in the Luneta-Intramuras Districts. For reasons not entirely clear, the Japanese continued to use only expedient mines—the most common being aerial bombs and marine anti-boat mines. Some were wired for electrical detonation from foxholes but, primarily because of our artillery preparations, no casualties resulted from deliberate detonation. Since most of these mines had been placed by digging holes in paved streets, detection was not difficult.

Minefield removal was largely the work of the 117th Engineers (37th Division) and the 127th Airborne Engineers (11th Airborne Division). The weight of the individual mines prevented removal by hand. The common system was unscrewing the fuze and then lifting the mine by a cable or improvised crane on a truck, tank or other vehicle. Much of this work was done under fire. The 37th Division Engineers removed several fields in streets near the City Hall under small-arms and mortar fire, by the successful use of a tank-infantry-engineer party. While infantry covered the area, the engineers moved out into the street in the shelter of the advancing tank, which fired its cannon at visible targets. Arriving at the mine, one engineer ran around the tank, disarmed the mine, attached a tow cable, and ran back to shelter. Then the tank, while continuing its fire, pulled the mine out of the ground and away from the area.

The 117th Engineer official report, in a prime understatement, says this system, while producing very low casualties, "was very nerve-racking on the mine-removal personnel."

Summary

Manila was cleared of the enemy on March 3. This article has touched only the high spots of the engineer story during these two months. Through it all, while the more spectacular tasks occupied the limelight, every engineer soldier drove himself without rest on the endless tasks which are always his. He supplied pure water to the liberated internees at Santo Tomas; he drove his bulldozer against the debris that blocked the streets of Manila; he built semi-permanent bridges replacing hasty by-passes; he probed captured areas for mines; he did all the jobs in the field manual, and others, too.

The Combat Engineer doctrine contained in our manuals and our school teachings is sound. The campaign proved that. It also proved, if it needed proof, that the American engineer soldier is tops—his technical ability, native ingenuity, endurance, and high personal courage make him a man with whom it is a privilege to serve.

Why Jap Air Force Died*

by Lieutenant Commander Philip Gustafson, USNR

IN a last-minute frenzy to find something that would stop our B-29s from destroying her industries and keep our fleets away from her shores, Japan was feverishly pushing the development of jet-propulsion aircraft when Hirohito ran up the white flag. Considering their late start, our air intelligence found, the Japs had made amazing progress. Yet, however well it was planned, this hastily built equipment proved to have too many bugs. Given time, the Japs would have eliminated them. But time ran out.

The Japanese aeronautical holy of holies was a straggling collection of thin-walled stucco buildings with flaking green-brown camouflage paint, flimsy hangars, and shabby aircraft parked every which way, some of them down on their knees from American strafing. On the surface, it wasn't much, but this was partly because there was so much beneath the surface: In the solid limestone of the Yokosuka hills were shops, hangars, storage and living quarters—a whole experimental aircraft factory underground.

Inside the shops, however, were dirt and disorganization. Hand benches. Hand tools. The hammering out of little pieces. Scattered disorder. Everyone had apparently worked in his own little messiness. There was no apparent clear flow of manpower effort.

"This was one of the very things that licked them," said Lieut. George Hall, USNR, grizzled, untiring, and tart of humor, who with Ensign Jimmy Wisely, USNR, went ashore with the Marines on August 30, the day MacArthur put his wheels down at Atsuki. His intelligence unit, which included representatives of the U. S. Navy, Army, and the RAF, was still living in front-line conditions when I arrived, cooking their own food, washing their own clothes, and flailing at fleas that abounded in the enemy's naval barracks.

"To my mind, the Japs were beaten before the first atomic bomb hit Hiroshima," Hall told me. "Their industrial system had been all but destroyed by our B-29's, their transportation system was breaking down, and all initial materials had been cut off by our subs and naval aircraft—stocks of aviation gas were so pitifully low that they couldn't even operate their current models. In semi-desperation they turned to rocket and jet-propelled development and committed all their remaining aircraft —between 8,000 and 10,000, they said—to Kamikaze attacks on our fleet. The Japs were a third-rate nation playing out of their league and the suicidal emotional drive they were trying to inject into their people would not make up for their own shortcomings in modern science and production."

This was the air force that four years before had challenged up to the heavyweight championship of the East and taken on the British on the side. And during the dark days of '42 its plagues of Zeros had come close to holding it. Then how did the mighty fall so low?

Admiral Hidao Tada, Chief of the Naval Experiment Station at Yokosuka, said one of the main reasons was the delay in replacing the Zero-type fighter.

"The high command was lulled into a sense of false security by the early successes of this plane, while your air force, with the sting of early defeat, began building on your Hellcat," he explained. "It was the Grumman Hellcat that beat Japan. When our high command did decide to put in mass production a plane to compete with your F6F, it was too late. We ran into design and production troubles. Then material shortages. In the end, we couldn't get the new fighters out in quantity."

Commander Yukio Otsuki, one of the chief designers; Vice Admiral Misao Wada, Chief of the Air Service Bureau, the Japanese counterpart of our Bureau of Aeronautics; and Vice Admiral Munetaka Sakamaki, one of the Navy's chiefs of air operations, told me the same story. Some of them blamed the delay on the General Staff and some on the fliers in the field, who clung to the idea of maneuverability. Admiral Wada said he had offered plane designs three years before with better armor, self-sealing tanks, and firepower but he had been turned down.

The story of the belated fighter development, as gathered from these different sources and from the confiscated aircraft themselves, is this:

Finally convinced of the inadequacy of the Zero, the General Staff ordered its designer, the great Horikoshi, to produce out an up-to-date fighter. Horikoshi went to work on the Reppu (Strong Wind) which turned out to be a gentle breeze. The trouble came when the Jap engineers, cut off from the countries they had always copied, had to turn to and bring out engines of their own. This same shortage of creative engineering talent, incidentally, showed up in other fields and proved to be one of the basic factors in Japan's undoing.

The Homare engine was the white hope to power the Reppu but it ran into bugs and more bugs. The electrical system was a nest for some. The lubrication system bred others. All of the headaches added up to a year and a half's delay and during this time the designers turned to the 18-cylinder Kinsei. This 18-month delay was fatal. Otherwise, said Admiral Wada, the picture might have been different, for the new plane was more maneuverable than the Hellcat, had good protection and heavier guns.

While Horikoshi was sweating out the Reppu, Ka-

*Popular Science.

wanishi came forward with a proposal to make a land fighter out of the float plane, Rex. The offer accepted, this plane was developed into the George 11. It was a good plane except that its aerodynamic characteristics were bad and the modification problems presented more difficulties than the hard-pressed Japs had time to contend with. They settled on mass production of the George 21—1,000 a month—but they overestimated their manufacturers, considering the problems of dispersal and material shortage that were then arising. The Japs say that if they had had the George 21 six months sooner, they would have discarded their other planes even to the old faithful Betty, and concentrated on this fighter.

As it was, when we walked in on the Japs we found their Navy with two good first-line interceptors in production—the George 21 and the Jack 34. With another six months to work the bugs out of George's landing gear and Jack's supercharger, Jap engineers would have brought these planes to the point where they spelled trouble for us. But for any change in the outcome it would still have been necessary to get the fighters into mass production, train pilots, and provide good maintenance. They were a good two years too late.

When their reconnaissance and air-raid warning system broke down, the Japs were wild for something that could get up in the air fast enough to stop the Allied bombers which were making a shambles of the home islands. It was then that, in their desperation, they turned the heat on jet propulsion.

They had reached the test model stage in a B-29 interceptor called the Shusui, to be powered with a copy of the Walther used in the ME-163, the first German rocket plane.

In another development, a jet coupled with an internal combustion engine was used in a new suicide plane, the Baka 22. A four-cylinder Hatsukaze, inverted in-line, air-cooled engine drove a single-stage compressor to provide the power for these specially built Kamikaze planes, of which the Japs had close to 100 assemblies in construction.

Probably their most outstanding achievement had been in the development of an axial-flow, turbo-jet engine with which they planned to power a conventional-structure interceptor called the Kikka. The first test model of the Kikka had gone in the drink in August when the pilot pulled the throttle on takeoff instead of pouring on full power. The Japs were also planning to use this engine in a new suicider designated as the Baka 43, which had reached the mock-up stage.

Besides pushing jet propulsion in their frantic, last-minute defense effort the Japs were also converting bombers into night fighters and interceptors. They were modifying all possible planes to carry inclined fixed guns which were to shoot from the most favorable position, beneath and slightly to the rear of the intended victim. Every device the designers could dream up was being used to make up for the mistakes which had put the Japs so far behind us in fighter types that virtually their whole naval fleet had been lost.

One of these mistakes was the failure to set up a good pilot-training and rotation system along the lines of our own. Japanese flying admirals, asked to explain the failure of fighter squadrons to use teamwork tactics, always gave the same answer: "bad interplane communications," and "not enough good pilots." The Japs, after they lost most of their best fliers in the battles of Midway, Coral Sea, and the eastern Solomons, never did catch up. After each battle they used to have to pull back their first-run fliers for a sort of general retraining program.

Wartime aviation in Japan worked under a continuous handicap: lack of cooperation between the Army and the Navy. The two branches fought like cats and dogs. All development, purchasing, and production were carried on independently until the latter stages of the war. This resulted in duplication of equipment which a small country like Japan could ill afford when she was trying to crack the big leagues.

Poor organization also carried over into the individual services themselves. Both Army and Navy were tightly compartmented organizations where one home command knew little of what went on in the next region, much less in the field of operations. One reason was the almost pathological caution of the General Staff in matters of security, probably made necessary by its policy of keeping the facts of life from the people. But in the Jap Navy, this policy boomeranged. Officers of the rank of captain and below usually didn't get the battle news! Obviously the results were inefficiency and failure.

"I didn't know what happened in what you call the Marianas Turkey Shoot," Commander Otsuki told me. "How was I to design airplanes?"

This compartmentation policy was a direct cause of one of the gravest errors that the Japs made, the introduction of too many plane types, with which they overloaded their factories. Both Army and Navy had a way of adding new types to the point of utter confusion. One count toward the last showed something like 70 types on the books at once. For this mistaken policy, the flying officers of the Jap Navy concurred in blaming the General Staff for ordering out a new model whenever combat conditions changed.

And here, in the field of production, according to Soemu Toyoda, the Admiral King of the Jap Navy, was the seat of the whole trouble.

"It was a situation that we in the Japanese Navy realized even before the war," Admiral Toyoda explained. "Even then, in the United States, machinery did the work; in Japan it was men. With our dense population we did not change then for fear of unemployment. In the war we had to adopt machine production but we could not convert the nation quickly enough from its traditional hand labor. This was the basic cause for the failure of our war effort."

Enemy Equipment Intelligence

by Colonel Paul N. Gillon*

THE rapid rate at which new weapons were developed during the war as well as the great disadvantage under which we entered it made acquisition of technical intelligence of the enemy's combat matériel, especially in the field of ordnance, vitally urgent. Steps were therefore taken very early in the war to secure, train, and place in the field, officers and enlisted men specifically charged with securing all possible technical intelligence on enemy ordnance. As the need arose, technical services other than ordnance organized similar groups and placed them in the field. The activities of these groups gained important information, and with their growth and augmentation it became increasingly apparent that the integration of all such activities was highly desirable. Accordingly, early in 1944, the Army Service Forces Enemy Equipment Intelligence Service Teams were initiated by General Somervell, then Chief of Army Service Forces. All technical services of the army were represented. The difficulties encountered were great, because there was no precedent for such an organization.

The team as eventually organized provided for 14 officers and 22 enlisted men. Personnel was assigned from the following technical services: Ordnance, Signal Corps, Chemical Warfare Service, Engineer Corps, Quartermaster Corps and Medical Corps.

The mission of ASFEEIST was the acquisition, examination and disposition of captured enemy matériel and related data. Its work made it possible to provide accurate and prompt knowledge of new developments, or new techniques in the use of enemy equipment to the various research, development, and design agencies within the technical services of the War Department, as well as to the appropriate staff agencies in both theaters of operation and the zone of the interior.

Headquarters were maintained at Oahu. Since the isolated campaigns of the Middle Pacific involved the taking of islands at great distances from Oahu, the team was organized into forward and rear echelons. The rear echelons were kept at a minimum, so that a carefully balanced team could accompany the assault troops.

ASFEEIST personnel did not arrive in the theater in time to send a balanced team on the Marianas operation; however, a few representatives of Ordnance, Signal and Medical services of the team were able to participate in the operation, or to visit the Marianas shortly thereafter. The results were extremely satisfying, and much Japanese matériel was obtained and evacuated.

The Leyte campaign was the first sizable Pacific operation in which the team participated. This operation provided the basis for the planning which was done for the subsequent Iwo Jima and Okinawa operations. A total of seven officers and 14 enlisted men participated in the ASFEEIST phases of the Leyte operation. The matériel captured here was shipped to the United States for examination and analysis.

After participating in the Leyte landings, ASFEEIST took part in the Iwo Jima operation, during which it collected and analyzed many items of enemy equipment that were of intelligence significance, particularly rockets, other ordnance and signal matériel.

The final campaign of ASFEEIST was the Okinawa operation, where sizable quantities of matériel were recovered for shipment. One of the most significant contributions of the organization on Okinawa was its conduct of field tests on Japanese demolition matériel and the Japanese 47mm antitank gun.

The primary function of ASFEEIST involved the collection and dissemination, not only of Japanese equipment, but also of information regarding such equipment. The contribution made by ASFEEIST to the training program of American troops should not be overlooked, however. Many reports for this phase were written in the field very close to the point of capture of matériel. Technical analyses of important Japanese items of equipment were prepared by both its forward and rear echelons. Also, numerous items captured in forward areas were returned to the interested services in the United States for analysis in the army's laboratories. Wherever two or more items were found, one was shipped to the mainland and one retained for analysis by ASFEEIST personnel. Further work, such as metallurgical examination, was carried out in the great laboratories of America's universities.

The two functions of analysis of matériel and the training of troops concerning the matériel are complementary and consequently as the war progressed, the activities of ASFEEIST relative to the training phase increased considerably. All items of equipment not urgently needed for technical examinations were utilized first for training within the theater and second for training purposes within the United States. Large quantities were shipped back to the mainland for the latter purpose. The training of troops within the theater relative to enemy equipment extended to most of the important types of equipment which the combat soldier was likely to encounter. An appreciation of the significance of this training can be had by considering the shoulder weapon. In night fighting the recognition of the sounds made by various types of rifle fire is of extreme importance. Accordingly, classes were conducted by ASFEEIST with Japanese 7.7 rifles which it had

*Ordnance Department. In charge of ASFEEIST in Middle Pacific Area, April, 1944, to August, 1945.

acquired in the forward areas and firings were conducted in comparison with our own M1, in order to demonstrate to the doughboys the difference in the report and the spacing of the rounds. In addition, familiarization firings with other weapons were conducted for the troops in order that they could appreciate the capabilities and limitations of the weapons which they might encounter. Similarly, instructions were afforded in many other categories of Japanese combat equipment.

It is interesting to note that ASFEEIST personnel were called everything from battlefield scavengers to professional souvenir hunters. However, both of these rather uncomplimentary terms fail completely to convey a proper idea of the manner in which ASFEEIST personnel operated. Contrary to the inference which one might draw from such terms, the forward echelon of ASFEEIST always operated with the front-line units. If it were not for this fact, little matériel of significance would ever have been obtained because forward combat units are prone to destroy enemy equipment which they overrun in order to prevent its subsequent use by infiltrating enemy patrols. Frequently it was necessary for ASFEEIST personnel to investigate underground localities before they were examined by combat troops, and the time available for such investigations was normally very short before the engineers sealed shut the caves by demolitions.

As an example of important inferences with regard to decreasing Japanese resources that were drawn from items investigated by ASFEEIST, it was found that textiles on Okinawa had been adulterated with hemp, that steel was being substituted for brass in cartridge cases, and that buckles on newly issued field bags were cloth-covered bamboo.

Numerous technical intelligence bulletins were prepared and disseminated on all categories of captured matériel. These bulletins ranged from a guide for identifying the markings on Japanese ordnance to complete reports on fire control equipment.

The ordnance section of the team sent back thousands of Japanese artillery pieces, mortars, rifles, revolvers, automatic weapons, and rounds of ammunition. In addition a complete set of Japanese fire control equipment was sent to Aberdeen Proving Ground. The other technical services made similar contributions in their fields.

Nearly 250 tons of Japanese ordnance matériel alone were returned to the United States for both intelligence and training purposes. These shipments included automotive vehicles, small-arms weapons, grenade launchers and rocket launchers, and artillery including both field and antiaircraft, twin mount cannon, and howitzers. The miscellany of fire control matériel sent included range finders and height finders, which represented practically the entire Japanese endeavor in this field.

The Signal Section unit, consisting of four officers and five enlisted men, carried out a training program of lectures and demonstrations covering the salient features of enemy signal equipment, and also issued numerous bulletins on enemy matériel. It captured a Japanese document on auxiliary receivers used in division communication units. It returned to the States for study and use in training, six tons of enemy signal equipment which included radar, radio tubes, crystals, wave meters, radiosonde receivers, direction finders and transceivers. In its Oahu laboratory, Jap signal equipment was studied, and circuit diagrams prepared.

The work of the Chemical Warfare Service unit, which was composed of one officer and four enlisted men, consisted of interrogation of POWs. The unit assisted in training 5,000 troops in the identification of Japanese chemical warfare matériel, and prepared more than 50 reports on it. The reports included analytical surveys of such matériel, and covered items ranging from filter paper and jettisonable fuel tank fire bombs to anticarbon monoxide canisters with which the Japanese army was equipped. New items found were shipped to the States for study. The Japanese entered the Pacific Ocean areas fully equipped for gas warfare, and it was apparent from examination of their chemical equipment that they fully expected gas would be used against them.

The Engineer Section unit, of one officer and two enlisted men, working in the same manner as other sections, sent to the States 23 tons of equipment. Japanese surveying equipment was much in evidence. A searchlight reflector was captured and found to be of German manufacture. Three complete Japanese filtration units were sent to the Chief of Engineers for analysis in the United States.

The Quartermaster Section unit, consisting of one officer and two enlisted men, sent reports out on such items of enemy equipment as bulletproof vests, gasoline lamps, portable fuel pumps and protective clothing. One such report compared U. S. and Japanese combat packs.

The Medical Section's contribution to enemy intelligence information was analyses of Japanese morphine, reports on the prevalence of diseases, and issuance of warnings to troops on several poisonous plants which abound on various islands. One item of considerable interest, which was forwarded with other matériel, was a Japanese microscope. A system for the identification of enemy antimalarial drugs also was originated by the medical section.

The lessons learned in the Pacific as a result of the work of ASFEEIST played an important part in the development of matériel by the technical services in the United States Army. By the process of analyzing every new item of enemy equipment the trends in the development of enemy matériel were deduced.

It is not sufficient, however, merely to make tests of enemy matériel to determine such obviously important knowledge as the range of his ammunition, the light intensity of his flares, the comfort of his field uniforms, or the effectiveness of his medicines. What is absolutely essential for appraisal of the captured item is that it be minutely scrutinized by all appropriate scientific facilities available for the job.

"BULLETPROOF" VEST

WOULDN'T it be wonderful if the following statement was true?

"A new type of protective armor for the individual, pliable as silk, light as a feather, but which will turn any projectile up to an eight-inch shell, has recently been invented."

Such a statement, however, is perhaps as far from the truth as it ever was, and yet the attempt to develop individual armor which will reduce battle casualties continues.

"Good" protective armor is a relative thing. It must afford considerable protection without unduly impairing the battle efficiency of the wearer.

Protective armor for infantry has not been a practical thing for several centuries. Towards the close of this war a new type of protective armor for the individual was developed, however, which may prove to be sufficiently practical to warrant its wear under battle conditions. This armor is a fibrous rather than metallic structure. The plates of this armor are not pliable, they do weigh more than a feather, and they will not turn every projectile which the mind of man has conceived. They will not turn a rifle bullet fired at a medium range. Encasement in an armored vest of this material will not eliminate the possibility of the individual receiving a chest or abdominal wound.

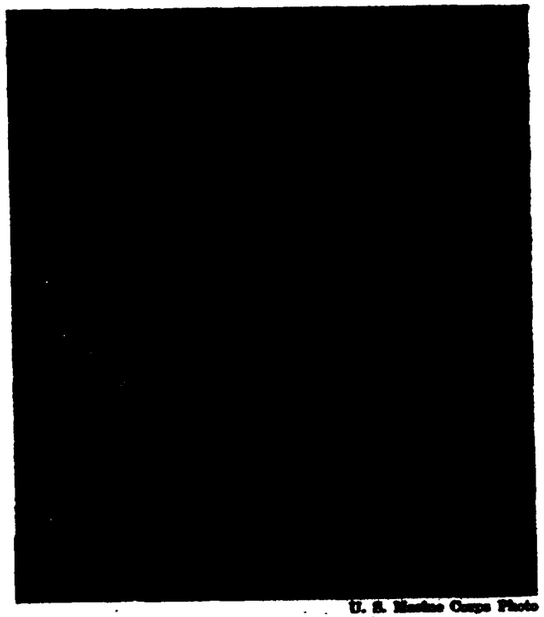
An armored vest of this material is not as comfortable as an old sweater. Yet it may be sufficiently comfortable and offer a sufficient measure of protection to warrant its adoption for battle wear.

The vest is not unduly heavy, weighing approximately five pounds, with plates one-eighth inch thick. Since the plates of the armor are not pliable, they cannot be extended to cover the lower abdomen and at the same time allow the individual sufficient freedom of action. The extension of the plates to cover the lower abdomen causes chafing and discomfort if the individual does much climbing, running, or engages in other vigorous activity. On the other hand, the lower abdomen is somewhat protected by the cartridge belt, and the plates may protect all the body above the belt line.

Undeniably, the vest is hot—a disadvantage less apparent in cold climates.

Since it is hot; since it is cumbersome, if not unduly heavy; since it won't turn a rifle bullet, what good is it? The answer lies in the fact that not all wounds are caused by rifle bullets. The armor will turn a .45 caliber bullet. It will turn most, but not all, fragments. It would turn a larger percentage of fragments if it were thicker, which would also increase its weight.

The percentage of deaths resulting from wounds in the chest and abdomen is high; studies indicate that the figure runs in the neighborhood of 50 per cent.



U. S. Marine Corps Photo

The number of casualties from fragments is generally greater than the number of wounds inflicted by small arms—some campaigns in the Pacific being exceptions.

The armored vest would markedly reduce the number of wounds of a type which so frequently result in death. By how great a percentage would it reduce wounds in the chest and abdomen from fragments? The answer to this question may not be given definitely, but very limited tests have indicated that one-eighth inch thick plates will turn approximately 75 per cent of fragments of a 60mm mortar shell and two-thirds of the fragments of 81mm mortar shells which have traveled a distance of 10 to 40 feet. The distance is, of course, only one of several factors upon which the chances of penetration depend. In the case of fragments from the same shell, some may penetrate, others may not. The armor gives greater protection against hand grenades.

This type of armored vest might not only reduce the number of casualties resulting from fragment wounds of the chest and abdomen, but might (let's be optimistic) possibly reduce the percentage of deaths resulting from such casualties, since the multiplicity of wounds to a given individual from a given shell may be reduced.

These vests were not tested in combat. The nearest they came to it was the wearing of a few of them during the mopping up phase on Okinawa. This test did provide some information as to faults of design.

This armored vest will not provide complete protection to the upper body, any more than the helmet provides complete protection for the head. It is not completely comfortable for wear at all times, any more than is the helmet. But like the helmet, it may now offer sufficient protection and be sufficiently comfortable to make men willing to wear it in battle.

Patrols In the Jungle

CONCLUSION

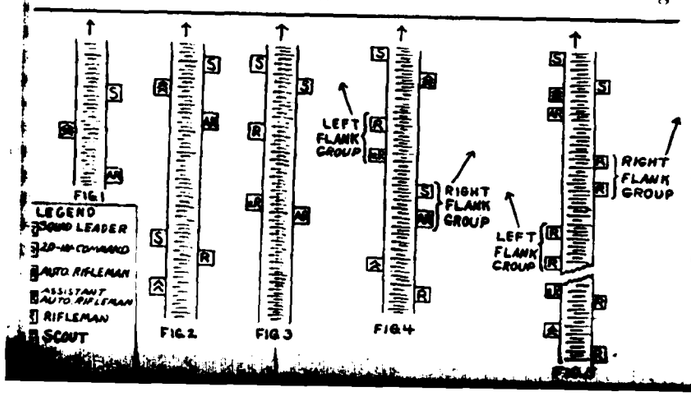
An article in the March-April issue of *The Cavalry Journal* described the basic considerations which govern the operation of jungle patrols, and included such subjects as the patrol's size, assembly points and objectives, maintenance of direction, equipment, etc. The following article describes formations that are adapted to both jungle and normal terrain.

IN jungle terrain, either on trails or in the bush, patrols will operate in column formation most of the time. It is generally not feasible to have a number of separate groups hacking their way through the thick growth at the same time; progress is too slow, the elements of the patrol become isolated, and too much noise results. Movement through the undergrowth is of necessity by column. Nevertheless, provision is made for flank groups in all jungle patrols. Even though these groups may not function on the flanks during forward movements, they do move out to the limit of visibility, up to 100 yards, during halts when march outposts are established. When normal terrain is entered, the designated flank groups begin to function on the flanks in the usual manner. Jungle formations of eight men or larger may be regarded as collapsed formations, which have been drawn together by terrain restrictions, but will open out to the normal form when the restrictions are no longer present.

Three-Man Patrols (Scout Team)

This formation consists of one man, armed with a rifle, who acts as a point and who is followed at 10 to 20 yards by a second man, also armed with a rifle, who in turn is followed at from 10 to 25 yards by the third man, who carries an automatic weapon. (See Figure 1.) The leading man gives his entire attention to observing the ground in the front and flanks, the second man looks for tree targets, the third man furnishes the fire power for protection of the group, and observes to the rear. The distance that is maintained between individual members of the team will vary with the visibility, as conditioned by the cover, bends in the trail, and whether the patrol is operating in daylight or in darkness. All members of the team must be constantly within visual distance of one another in daylight in order to afford mutual protection and control. At night, sound signals must be used and distances reduced.

The three-man patrol, or Scout Team, should be used on jungle trails as the point of a larger patrol, or as a small reconnaissance patrol which is to operate alone. It may also be used effectively to replace the usual scout screen employed by combat platoons during their approach march.



Four-Man Patrols

When the three-man scout team is to operate alone as a patrol, a fourth man may well be added to the group so that the leader is not required to do his part of the three-man job, but can devote his attention to planning, and supervising, the conduct of the patrol. The efficient action of the basic team is thus preserved, and it can be controlled more effectively.

Six-Man Patrols

There are two methods of utilizing six men in jungle patrol formations. Whichever formation is selected, it should be appropriate to the terrain and visibility. In one the six men are arranged in two three-man scout teams, one ahead of the other, separated by a distance of from 15 to 50 yards, depending upon the visibility. The patrol leader is part of the leading team. (See Figure 2.) This formation permits flank movements by the rear group if the forward group is pinned down by enemy fire, and it also minimizes the danger of ambush

of the entire patrol. The rear team can act as support group for fire and maneuver to extricate the forward group from a dangerous situation.

At other times a simple doubling of the basic three-man team works well, although there is a greater danger from ambush if members become closely grouped. (See Figure 3.) In this case the two leading scouts observe over a 90° arc to the front and opposite flank, the two following observe for tree targets on the side of the trail opposite to them, and the two automatic riflemen cover by fire any targets on either side of the trail. The control, the detailed observation, and the concentration of fire power that are made possible by this formation are favorable for the rapid location of enemy positions along trails, and effective subsequent action.

Seven-Man Patrols

When two basic scout teams are used on a patrol, efficiency is increased if the leader is not a member of either team, but is free to supervise the entire patrol. The seven-man patrol is generally superior to the six-man patrol because of the opportunity for better leadership. The leader will usually be with the leading group unless the patrol is on a well-defined trail.

Eight-Man Patrols

One natural formation for the eight-man patrol is the same as that for the six- and seven-man patrols, except that the leader and his second-in-command are both free to move about as the situation requires. The most suitable formation for eight men, however, is the normal diamond, with flank groups collapsed, and in column on the track during movement. While moving, the leading scout pair, which will include the leader, performs its normal point functions; the next two men are designated as a right flank group; the next two men form a left flank group, which observes to the right and left respectively; and the rear pair become the rear point and function as such. In column on the trail, the groups are separated from each other by from 10 to 15 yards. Upon halting, the flank groups take up flank positions off the trail and the diamond formation develops. When normal terrain is entered, the flank groups move out and the normal diamond formation is resumed. (See Figure 4.)

Twelve-Man Patrols

Because of the canalizing terrain of the jungle, the same principle of using a collapsed diamond formation for eight-man patrols applies equally well to 12-man or larger patrols. The 12 men are organized so that three-man scout teams constitute the point and rear point, and scout pairs act as two flank groups. The leader is in the point group. On the march, all groups are in column behind the point, and are separated by 10 to 15 yards, depending on visibility. Upon entering normal terrain, and at the halt, the normal diamond form is adopted by having the flank groups move out at appropriate distances. (See Figure 5.)

FORMATIONS FOR NORMAL TERRAIN

The basic formations described here are not new, and have been used under normal terrain conditions for a long time. They are applicable to a great deal of terrain, and should be employed whenever conditions permit.

Eight-Man Patrols

Although an eight-man patrol may be used in a number of formations—and under certain conditions they should be used—the more common one is the diamond formation. In it the eight men are generally arranged in pairs to form the four points of the diamond. In operation, one man of the leading team observes for ground targets, while the other man, the leader, looks for tree snipers. The flank men operate similarly, with the outside man, who is the ground observer, in advance of the inside man, so that the protecting fire of the inner scout will be directed away from the patrol when his partner encounters resistance from tree snipers. The rear pair divide responsibility by having one man observe to the rear and one flank, while the other watches the patrol leader and the other flank. To facilitate control, all inside men keep in visual contact with the leader. Direction of movement of this formation is easily changed upon signal toward either flank or to the rear without interrupting the formation or the functions of the individuals.

Nine-Man Patrol

This patrol functions in the same manner as an eight-man patrol, except that the leader is free to move from place to place as the patrol changes direction instead of serving as an integral part of a two-man scout team. There is a considerable advantage in having the leader more "mobile," although usually he will be with the point.

Twelve-Man, and Larger, Patrols

***The Diamond Formation*—Four groups of two or three men each are arranged so that the entire patrol is in the shape of a diamond. Individuals within each group are separated by from 5 to 10 yards. The point and rear point groups are essentially three-man scout teams. The flank groups, of two men each, place themselves in such a position that the outer scout is slightly ahead of the inner. The leader will normally be with the leading group. Intervals and distances between the four groups of the diamond will vary according to terrain conditions, cover, visibility, and proximity to the enemy, but the front-to-rear axis of the diamond seldom will exceed 150 yards. The frontage covered will be limited by the visibility. Advantages of this formation are the all-round protection provided, the rapidity with which its direction may be changed, and the ready control it permits the leader. If attacked, the group has an all-round defense immediately available.**

***The Squad Column*—In this formation, the men are arranged in a single column with the leader at the head.**

In the column, individual members of the squad take a distance of from 5 to 10 yards from each other. The two-man scout teams stationed on the flanks may take an interval of 100 yards from the column, if visibility permits. The patrol sends two scouts forward and two men to the rear. This formation allows a great rapidity of movement and a maximum of flexibility in control. A small frontal target is presented to the enemy, and a maximum of flank observation is possible. Also, when a change in natural cover requires more detailed examination of the ground, it permits a rapid change to the skirmish line formation.

Skirmish Line (T Formation)—The men are spaced at intervals of from 5 to 10 yards in irregular line. The command group of the patrol precedes in column usually at a distance of 10 to 75 yards, depending upon visibility. Men are assigned to flank groups and detailed to observe and reconnoiter on signal. This formation has the advantage of dispersion, and permits the examination of a wide front thoroughly as well as visual communication between members of the patrol. Control during daylight is maintained by relaying signals from man to man, and at night by voice or other sounds.

Wedge Formation—Individual patrol members are arranged in such a way that a scout pair or a three-man scout team, including the leader, leads the way. They are followed at 10 to 75 yards, depending upon visibility, by men uncovered to the left and right by intervals of 5 to 10 yards. The customary dimensions per squad are a frontage of up to 100 yards, and distance from front to rear of approximately 100 yards. This formation provides the advantage of close coverage of terrain over nearly the same frontage as the skirmish line and, at the same time, it facilitates thorough observation to the flanks. Each man has a relatively small sector to observe. It provides the same ease of control of a squad column and, in addition, it may be rapidly changed to an all-round defensive group in case of attack. The end men on the two sides of the wedge are charged with observation and protection of the patrol from the flanks. Two men, led by the second-in-command, constitute the rear point. The formation has a wide adaptation and may be used in either open or close terrain, but it is not suitable for work on trails or other canalized approaches.

Report of Patrol Leader

Upon returning from a patrol, the leader makes a report to the commanding officer who sent him out. The report should be written unless the situation at the time is too mobile to permit it. The report covers the following points:

Size and mission of the patrol.
Time and departure route.
What was observed—number—composition, equipment and attitude of the enemy.
Where observed—doing what, and direction of movement, if any, with exact location.
When observed.
Nature of terrain covered.
Route and time of return.
Condition of the men and casualties.

Reports may well take the form of overlays upon which the pertinent information above may be accurately plotted, and explanatory marginal notes added, as required. Information in overlay form is readily transferred to unit situation maps and is usually more accurately reported than is possible by the use of words.

Illustrative Patrol Problem

First Phase: The following verbal order was issued by the company commander at 0600L, November 17, 1942:

"Sergeant, I have an operation map here—get where you can see it.

"An enemy infantry battalion with some pack artillery is advancing south along the coast and was reported to be in the vicinity of Pongani yesterday afternoon" (pointing to location on map) . . .

"Our battalion will march from our bivouac here at Kinjaki to Pongani on the morning of November 20. An Australian patrol will be sent to the vicinity of Pongani today.

"Take seven men of your squad as a patrol to determine the presence or absence of the enemy and their number in the vicinity of Pongani. You will observe and report the condition of the trail" (pointing to trail on map) . . . .

"You will prepare your men for the patrol and move out at 0800L today. You will report to the battalion commander by 1200L day after tomorrow. You will meet the battalion at the stream junction south of Pongani, here" (pointing) "on November 20 to act as guides. Do not engage in a fight unless it is necessary.

"Take enough rations to last five days. See that your patrol has at least three compasses. Each rifleman will take 40 rounds of ammunition and each automatic rifleman will take 120 rounds. Take one pair of field glasses, a pair of wire cutters, and a watch.

"Battalion CP—Kinjaki until 0600L November 20.

"Send messages to the battalion CP.

"Any questions? It is now 0615L."

Second Phase: After a short period for study of the requirements, the squad leader assembled his patrol and gave the following warning order informally in his own words. He made sure that each man understood what his particular job was before continuing. He did not announce paragraph numbers.

Warning Order

"Natives report that an enemy infantry battalion and some pack artillery were in the vicinity of Pongani yesterday afternoon, November 16th.

"Our battalion marches on Pongani from Kinjaki

November 20th. An Australian patrol will be operating in the vicinity of Pongani.

"Our patrol will march on Pongani at 0800L to report the presence or absence of enemy in the vicinity. Route of march: the trail shown here on my map. We must observe and report the condition of this trail.

"I want you men to draw five days' rations from the mess sergeant. Graham, take 120 rounds for your tommy gun. Brown, check the ammunition the other men have and draw enough from the supply sergeant so that every man will have 40 rounds. McDougal" (second-in-command), "make a tracing of my map, draw a pair of field glasses from the supply sergeant and be sure to bring your compass. Graham, draw a pair of wire cutters. Gilucci, draw a compass. Fall out and assemble here at 0745L. It is now 0630L. Be sure you have good shoes, no shiny equipment, none that rattles, and no insignia. Leave all papers, letters, documents that would identify us, at the company orderly tent."

After preparing his own equipment, the squad leader studied his map and prepared his order for the patrol. The squad reassembled at 0745L. The squad leader had them fall in and inspected them to see that all of the provisions of the warning order had been carried out. After the inspection was completed, the squad leader rapidly repeated the first three paragraphs above, and then continued his order as follows:

Order

"Brown and Cohen to the left.

"Gilucci, you are air scout. Work in a pair with McDougal. Have you got it?

"McDougal, observe to the rear. When I have gained 50 yards distance send the squad forward in squad column formation, opened out, seven yards interval, five yards distance. Watch me for signals. Got it?

"Graham, work in a pair with me. We will precede the patrol by 50 yards.

"First objective: our outpost line 800 yards north. The trail passes through it as shown here on the map at this stream crossing.

"First assembly point: right here.

"Password: Powder River.

"Report any enemy you see to me. Fire on my order only. Don't shoot first but take cover and watch me for signals. If I am bumped off, our messages are sent to the battalion commander here. We must report by noon November 19th. We rejoin the battalion on the trail south of Pongani November 20th to act as guides for the battalion. I will designate the exact location when we pass it.

"All of you watch out for airplanes and gassed areas.

"Do you understand what you are to do: Do you, Marcinski? If you don't, now is the time to ask questions, not down the trail.

"Alright Graham, move out. I'll follow you at 15 yards. Watch me for signals."

Third Phase: The patrol moved out to its first objective in opened-out squad column formation, because it was in territory within its own outposts. When this point was reached, a new objective was designated and a new assembly point was pointed out on the ground near the old objective. Upon entering territory outside of our outpost line, the squad again took up the opened-out squad column formation which was suitable for rapid movement along the trail.

As the patrol approached Pongani, however, more care was exercised by adopting formations in normal terrain with more dispersion, such as the diamond, skirmish line or wedge, depending upon the type of cover. When traversing jungle terrain the eight-man jungle patrol formation was used.

During each halt, march outposts were established and the bivouacs on the nights of November 17—19 were protected by double sentries working in three reliefs. Slit trenches were prepared in a form to give all-round protection in case of attack during the night.

On the morning of November 19, the patrol observed an enemy patrol of six men on the trail south of Pongani. They were going north and were talking freely as they proceeded along the trail. The message sent to the battalion commander was as follows:

"MESSAGE. No. 1. To: CO, 1st Bn. 19 November, 1942.

"No enemy troops observed west of Pongani to 0630L 18 Nov. Observed six-man dismounted enemy patrol moving north on Pongani-Kinjaki Trail 300 yards north of point where Mangare Ck. crosses the trail at 1030L today. Enemy careless and noisy. Will continue mission.

Leader Patrol No. 1
1040L
Gray, Sgt."

Fourth Phase: On the afternoon of November 20 the patrol met the battalion at the stream junction south of Pongani and the leader submitted the following report to his company commander:

"Patrol of eight men, with a mission of determining the presence or absence of the enemy in the Pongani area left Kinjaki at 0800L 17 November and followed the main track until the stream crossing over Mangare Ck. was reached. At this point the patrol left the trail and reconnoitered the area to the west of Pongani—saw no enemy. At 1030L on November 19, a six-man Jap patrol was seen on the main track going north 300 yards north of the Mangare Ck. crossing. They were talking and had no security groups out.

"Terrain was hilly and intermittent patches of kunai grass and tropical forest. Native trails are abundant in the area southwest of Pongani where many villages are located. All trails passable for foot troops and bantams. The patrol returned to the stream crossing over Mangare Ck. this morning. The men are in good condition, although Gilucci has a blistered heel.

Gray, Sgt.
Leader Patrol No. 1."

Two Years Under Wingate

*by Brigadier Bernard Fergusson, D.S.C.**

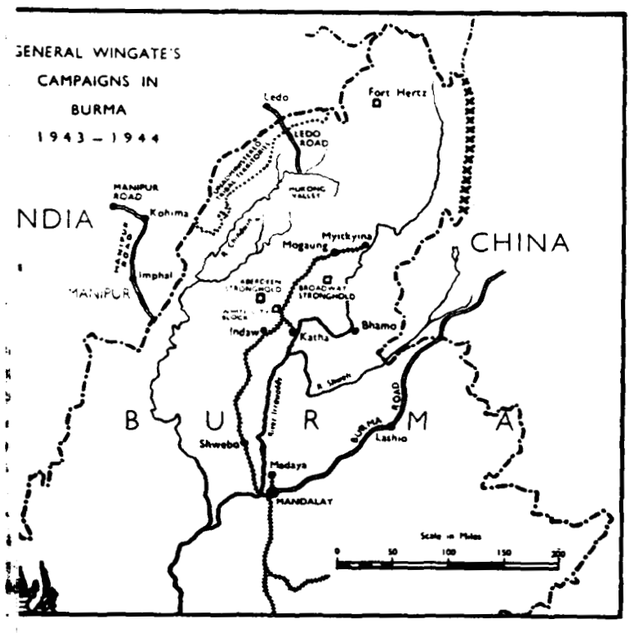
SOME hours after dark, during a thunderstorm on March 24, 1944, a B-25 crashed into a remote hillside in southeast Asia. Four Americans and four Britons were killed. A week later, the Japanese burst into Rangoon jail, chattering in exultation, to tell the Allied prisoners that Major General Wingate was dead.

At the moment the catastrophe happened his brigades were poised to close in on their objective of Indaw, a small town in Upper Burma, 140 miles down the railway from Myitkyina. Only the day before, Wingate had flown in to discuss plans for the assault with me. He had landed on a light plane strip, located 25 miles short of Indaw, that I had constructed for the purpose. Deployed in the surrounding jungles were nearly 2,000 of my men; 11 months earlier, in the same area, I had been sneaking out to India with 30 men, some wounded, most of them sick, and all near to starvation.

What was the difference between the campaign of 1943 and that of 1944? What lessons had been learned in the first, and how were they exploited in the second? What was the object in each year, and what was the gain?

Two years after Wingate's death, it should be possible to view his two greatest campaigns in perspective, and to make some assessment of his own worth, unswayed by the emotions of the moment and undazzled by his almost hypnotic personality.

*Staff of Combined Operations Headquarters.



Lessons of 1943

The 1943 campaign was no more than a demonstration; its aim was no higher than sabotage. Wingate's purpose was to penetrate far behind the Japanese lines, to play havoc with the Japanese supply system, to tie up Japanese troops on unprofitable guard duties, and thus to help the main armies in their grand advance. He proclaimed that two modern aids to war had not been fully exploited by the infantry: the first was air supply, the second radio.

Hitherto, air supply had been used only in emergency—when troops had found themselves surrounded. The Australians had used it in New Guinea, and Koenig's Fighting French at Bir Hakeim. Wingate was sure that it was reliable as the sole means of supply over a long period.

All that could be allotted him in the way of aircraft was three C-47s and two Hudsons. The Hudsons flew so fast that the canopies were stripped from the parachutes as soon as they opened, so we had to fall back on the three C-47s. Yet the system worked, and the greatest direct result of the expedition was the confidence which it engendered in air supply—a material contribution to the winning of the war in the East.

The offensive which the expedition was planned to help had to be postponed, and as a result the expedition itself came within an ace of being cancelled. But we were all keyed up to go. Wingate wanted to demonstrate that he could do what he claimed; all of us wanted to confound the skeptics. General Wavell acceded to his request, and on February 5, 1943, accompanied by the American General Somervell, General Wavell wished us good luck at Imphal.

I next saw Imphal on April 26. I had reached the first British post on the west bank of the Chindwin River two days before. Wingate was still missing, but was to turn up three days later. We had come out in the small groups into which we had split when surrounded by the Japanese who had encircled us on the far side of the Irrawaddy during the last week of March, just after we had turned for home. Most of us had had a bad time. We had been forced to jettison all our mule-loads, including wireless sets, with the result that we no longer could get food dropped from our faithful allies of the RAF. In my own small party a number of men had been lost from starvation: we had had one period of 11 days on three mugfuls of rice and

two malted milk tablets per man. The losses over the whole force finally came out at 35 per cent, of whom some were recovered two years later, when Rangoon was recaptured.

On the asset side, apart from demonstrating the possibilities of air supply, we had killed a fair number of Japanese; learned a lot about tactics and topography; given the enemy a great deal of irritating exercise in marching and countermarching; damaged their main railway, though not lastingly; and learned much about their defensive layout in the area. We had established also the temper of the inhabitants of the country, who had proven strongly pro-British and anti-Japanese. For every one that had double-crossed us from motives of fear or greed, a hundred had helped us at the risk of their lives, particularly when we were stumbling out hungry, sick and wounded. I know of one in particular who was mutilated and then tortured to death and yet did not divulge the hiding place of one of my wounded officers whom I had had to leave behind.

Moral Suffering

Of our sufferings, the worse were moral. Before leaving India, we all had realized that any man who was too sick or badly wounded to keep up our pace must drop out. Of all those whom I had to leave, not one complained or made it more difficult to leave him than it already was. The first party I left consisted of five wounded. All fell into Japanese hands and only one survived. My adjutant and his orderly also were captured. He was an Australian officer of my own regiment, the Black Watch, who had been in the Tobruk siege with me. The Japanese shot them both. Altogether, out of my own column of 318, 95 reached safety; and of the 80 who were taken by the Japanese to Rangoon, only 28 survived the two years of imprisonment.

A word about our loads and our food might be of interest. Every man carried 72 pounds of kit, which included seven days' rations, rifle and bayonet, jungle knife, three grenades, spare shirt and trousers, blanket, waterproof sheet, four pairs of socks, life jacket, water-bottles, and miscellaneous. We had no special kit, just the old prewar issue articles.

Our daily food ration was 12 biscuits, two ounces of cheese, two ounces of nuts and raisins, some dates, 20 cigarettes, acid drops, tea, sugar and milk. One day's rations weighed two pounds. Our orders were, however, that seven days' rations must last 10 days. We were sometimes able to eke them out with meat off a mule killed or a buffalo bought for the purpose, or rice, until the Japanese got wise to us and garrisoned all the villages to stop our foraging.

The most welcome meal I remember was of raw buffalo meat—after being without food for three days we had come upon three buffaloes and could not wait to cook them. I recall another meal of 12 loose grains of rice which I found, black and dirty, in the bottom of my pack. My normal weight of 175 pounds had shrunk to 128 by the time I reached the British lines. Two ounces of that was a chunk of metal in my posterior off a grenade, which had joined up with me 350 miles short of home.

That was the 1943 campaign. There were several reasons why 1944 was different. One was that the first show had been adjudged worth while, and Wingate had won widespread attention to his case, as well as interest in what he was likely to propose next. The second was the vast strides which his quick mind had made through his latest experience. On the way back to India he had lain doggo for a fortnight to let the hue and cry pass him by, and had sorted out the lessons of the campaign in his mind while he waited for the coast to clear. The third reason was the powerful backing which he won for himself from Mr. Churchill and President Roosevelt, and their advisers, at the Quebec Conference in August, 1943. The fourth was the devotion and enthusiasm of the American airmen of No. 1 Air Commando, under Colonel Philip Cochran, who, as a result of Quebec, now came into the game with us and joined our family.

Wingate was not prepared to be content any longer with mere raids and sabotage. He was aiming higher. His plan now was to capture an enclave right in Burma—an all-around bridgehead far beyond the enemy's lines. Let the Japanese stew as they might in the hot, valueless jungles; we would overleap them, land from the air at some strategic point where we could build and hold our own airfields, and then fly in new formations to exploit from there. We knew the country now, and we had learned which were the key roads, the key garrisons, and the reinforcement routes between each. If we set up near Indaw we could at the same time starve out the Japanese facing General Stilwell's Chinese, who were advancing painfully over the Ledo-Hukawng Valley route, and exploit our enclave.

This plan failed only because, with the Japanese thrust across the Chindwin in March, 1944, all of the troops which Wingate had hoped would be available to exploit out of the enclave were eaten up in the need to defend Imphal. If Imphal went, the Japanese could reach the Assam railway, which maintained not only the British-Indian forces round Imphal, but also General Stilwell's forces based on Ledo.

Stilwell's Material Help

The plan has been criticized on the grounds that it failed to affect the "main battle." This has the elements of truth, although it is less generous than it might be. General Stilwell's advance was materially helped; quantities of Japanese were killed, and most of their reserves engaged—all, in fact, except those who were committed to the defense of the seacoast for fear of a seaborne invasion. But the real point is that the plan was devised to assist in an offensive battle, whereas, as things turned out, the main battle that season was defensive, through no fault of the plan. It became defensive largely because

the decisions made at the Quebec Conference could not be translated into reality for some little time, although they were hurried on at record speed. Cochran's air forces could not complete their assembly or deployment until February, and few if any other men could have completed these processes by then.

My own brigade was unlucky, in that, unlike the others, it was to march in again, in the old-fashioned style. We left Ledo at the beginning of February. The first of the flying brigades, Brigadier Mike Calvert's, was put down some 70 miles from Indaw between March 5 and 8; and the second, Brigadier Joe Lentaigne's, followed immediately after Calvert's. Mine reached the same area about March 22, after some hair-raising marching over much new country. (We marched 360 miles of the distance in single file.) But by this time the Japanese were pouring across the River Chindwin, subsisting on ration dumps which they had been piling up busily for many months past; they had not even any line of communications vulnerable to us. And then, Wingate was killed.

All April the fighting went on round about Indaw. The angry Japanese formations battered themselves to pieces on the blocks and strongholds which had set up under their very noses on the railway. The second week in May the Wingate force began moving north, to integrate more closely with General Stilwell's objectives on the line Mogaung-Myitkyina; and after the capture of the former town their task was at an end. In August they came wearily out. Casualties had been heavy, and sickness during the monsoon cruel, but all ranks were pleased with their achievement.

Much has been written and said about the actual airlift of Calvert's and Lentaigne's brigades, and rightly so. The technique of putting down gliders with bulldozers in unprotected country far behind the enemy's lines was new, and Lieut. Colonel Taylor's glider pilots did a wonderful job. But there was far more new stuff than that. The integration between the pilots and the men on the ground was the closest the war had seen, and all done by a nice mixture of radio, comradeship and mutual confidence. Allison and Olesen of the fighters, Mahony of the bombers, Rebori and his boys of the light planes—these American officers were far more than names to our men, but their names were known all through the infantry none the less. My own special ally was Colonel Clinton B. Gaty, who built my airfield, and lived on it with me for six weeks—a close and trusted comrade whose death occurred over Shwebo a year later.

I have said already how the most cruel feature of the first year was leaving behind the sick and wounded. In 1944 that was almost unknown, thanks to the L-1s and the L-5s of Cochran's force. They landed around villages on perilous strips which had been hastily smoothed in the paddy fields, then took off again with their emaciated wounded, and flew them back to the big strip, where British or American C-47s would come in at night to lift them back to India.

Broadway and Aberdeen

We had two principal bases in the heart of Burma. One was Broadway, the scene of the original glider landing; the other my own at Aberdeen. Broadway was in an area scantily inhabited even by natives; Aberdeen lay in a valley half a mile wide, with villages upstream and downstream, and a pleasant river, two or three feet deep, running through it. The C-47 strip, 1,200 yards long, ran due north and south. We were landing aircraft on it within three days after Colonel Gaty began work there. Our light aircraft lay tucked into the side of a hill up a little re-entrant, and their pilots lived beside them. Two defended hills covered the strip, each designed to hold one battalion in defense.

To please the villagers, and to induce them to work for us, we started a shop. In it we sold clothing, kerosene, and matches, and all the necessities of which they had been deprived under the Japanese. We paid them for working for us and then they could go and spend their earnings in the store.

Two brigades besides my own were based on Aberdeen. I was given two extra battalions to defend it, and seven AA guns. In point of fact we managed to keep the Japanese so busy covering himself from our punches that he never had leisure to try conclusions with Aberdeen except by air. Minor air raids occurred continually, but our barrage was good, and the Japs never got to close quarters. He caught us slightly once or twice, as when he shot down a C-47 just coming in to land (the pilot got her down without casualties), and again when he induced us to switch on our flare path and then dropped a bomb on the runway.

In 1944 we also fared much better in the way of food than in 1943. We never went hungry, and we had three pounds of food per man per day. I gather that the K ration is not popular with the GI. We thought it paradise, and lived on it for three and a half months, varying it only on the occasion of a supply drop when we got the addition of bully beef and dehydrated potatoes. We also got what the British soldier cannot do without—tea, sugar and milk.

A month under Wingate was worth two years in college. 1943 was pretty good hell. 1944 was all right. That second year 500 American airmen and several thousand British soldiers got to know each other inside out. If any of those 500 see these words, let them know that two Chindits cannot meet and gossip in Britain today without thinking of No. 1 Air Commando, and raising a glass.

Strategist

As for Wingate (who, unlike so many of his men, was found and buried), none who served him, British or American, will ever wholly free themselves from the influence of his character. Announcing his death in the British House of Commons, Mr. Churchill described him as "a man of genius who might have been a man of destiny."

Britain's "Swimming Tanks"*

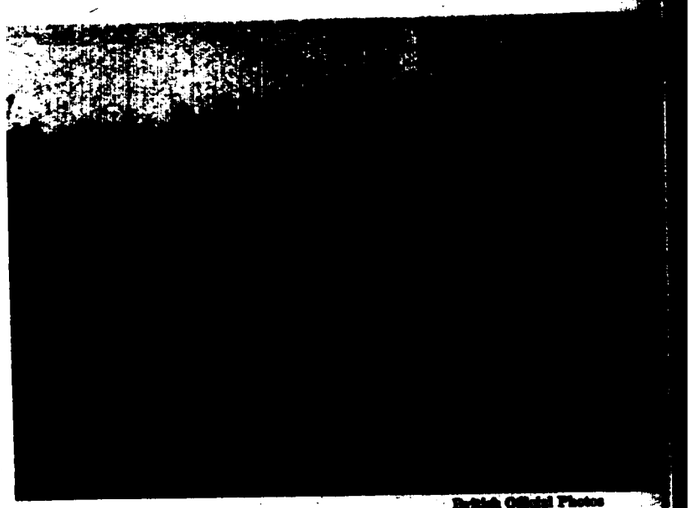
BRITAIN'S secret "swimming tanks"—which went ashore on D Day to rampage among German pillboxes and knock out enemy guns before they could fire on the assault waves—are estimated to have saved the lives of 10,000 Allied soldiers.

These 40-ton seagoing vehicles, known to Allied armies only by the code letters DD, which stood for Duplex Drive, saved other lives by providing immediate and adequate tank support during the crossing of the Scheldt Estuary, the Rhine and the Elbe. They were to have been one of the surprises in store for the Japanese.

Standard tanks which are brought in close to the shore on landing craft make large and vulnerable targets. But swimming tanks—which are put into the water several miles offshore out of range of the coast antitank defenses, and which ride so deeply in the sea that they resemble infantry assault boats—present small and scattered targets.

The "swimming tank" was developed after a British inventor, during the early days of the war, began experimenting with a swimming device on a Tetrarch tank which was completely successful. Later, designs were perfected which led to the production of many DDs in Britain, and the manufacture of nearly 400 in the United States.

To make DD tanks buoyant, the hull was waterproofed, and a canvas screen was fitted on which could be raised and lowered. When the screen is in the raised position it extends above the turret level, so that when the tank is afloat only a foot or two of the canvas is above the water. The tank therefore looks like a collapsible infantry assault boat. Such an appearance proved advantageous and caused the enemy, on occasion, to engage the vehicles with small arms instead of HE fire. The resulting minor perforations had no effect upon the performance of the tanks, and the small quantity of water which was shipped was soon removed by the bilge pumps.



British Official Photos

Rubberized walls attached to tanks made them seagoing. Shown above in France are Shermans with the walls down.

When the tank reaches sufficiently shallow water to be borne on its own tracks, the screen can either be lifted up at the rear for protection from the waves, and deflated partially at the front so that the turret gun can fire—or the entire screen can be dropped. Either operation is carried out instantaneously, and once the screen is lowered the tank is a normal fighting machine.

During seaborne assault operations, the DD tanks can be launched from landing craft, move through fairly rough seas, and go into action immediately upon reaching shallow water in which the screens can be lowered. In still water, a speed of four or five knots per hour can be attained.

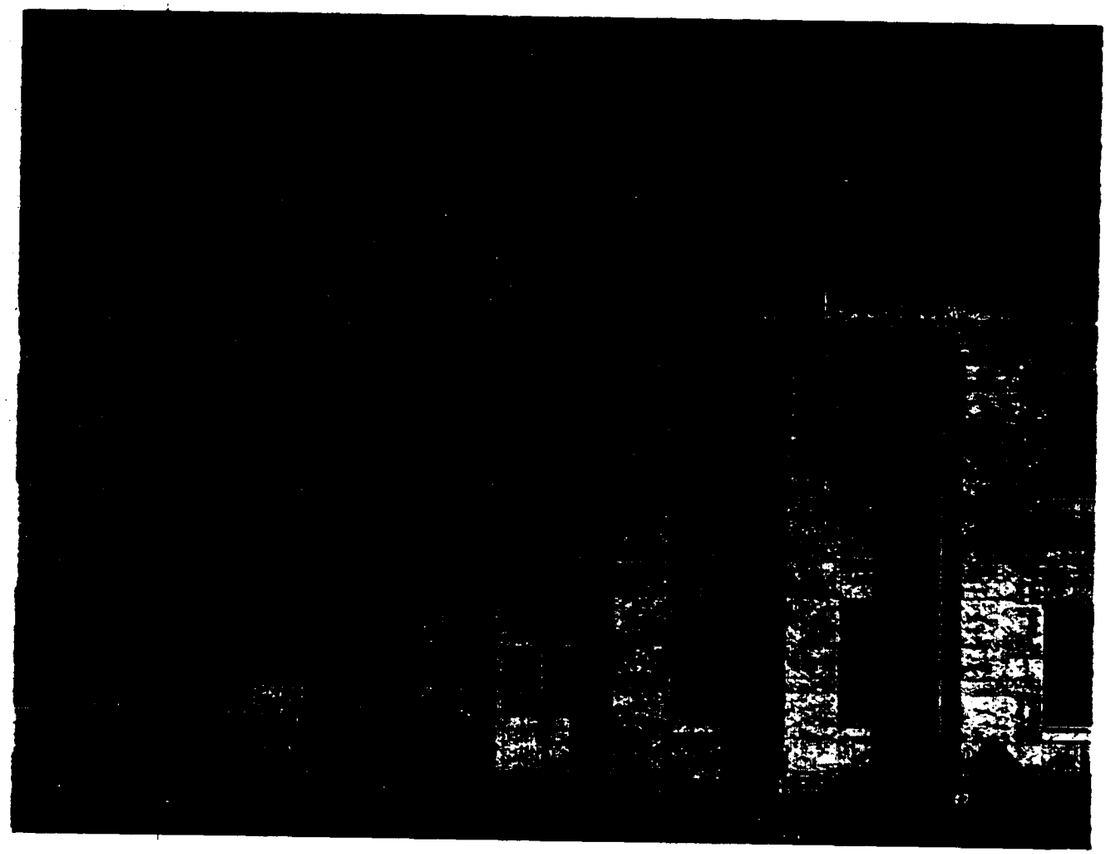
DD tanks can also help bring in supplies during the early stages of an assault by towing to the beach floating sledges loaded with ammunition and stores, which they can drag some distance ashore. Such sledges, known as "Porpoises," were successfully employed on D Day.

The tank is propelled through the water by twin propellers at the rear which are driven from the tracks of the tank, and that can be swivelled by tillers, left or right, for steering. The propellers are raised for the clearance of obstructions when the tank operates on land.

Various auxiliary equipment must be used with the tanks, including special periscopes and compasses for navigation, and a modified form of the Davis escape apparatus, which is worn by the crew.

*British Information Services.

With its walls up, a Sherman DD, capable of four to five knots in still water, crosses the River Adige in Italy.



Dedication of Patton Hall

THE name of George S. Patton, Jr., was sustained in stone at The Cavalry School in April before persons who had gathered from many parts of the world to pay homage to a man whose exploits are legend.

Five thousand persons assembled before the academic building of The Cavalry School to see Mrs. George S. Patton, Jr., widow of the famed general, unveil the 14-inch bronze letters marking the beautiful native stone structure as a shrine to her husband.

Secretary of War Robert P. Patterson and General Jacob L. Devers joined with scores of other high military dignitaries to pay tribute to one of America's top-most field commanders.

"No more fitting a place for a memorial to General George S. Patton could be chosen than here at The Cavalry School," Mr. Patterson said.

"George Patton, the soldier, was first and last a cavalryman. It is only right that his memory should be honored here. The honors we pay him, the monuments we erect to him, can be only poor reflections of his place in American history. The memory of the man himself will be enshrined by generations to come as one of the greatest of our soldiers.

"All his years he bent his efforts wholeheartedly to perfecting himself as a soldier.

"He had no use for half-measures. He wrote a few days before his death that anyone in any walk of life who is content with mediocrity is untrue to himself and to American tradition.

"Three basic principles guided his life. They were an unswerving will to master his profession, an unsparing devotion to duty, and an unshakable trust in those who served with him."

General Devers, commanding general of the Army Ground Forces, then recalled his acquaintanceship with General Patton.

"I am very happy and very proud," he said, "to be in this assembly to honor my late comrade.

"I have known George Patton since we were plebes together at West Point. He was a fine athlete, a gallant sportsman and a sure leader. He exemplified the unbeatable American qualities of competitive spirit and team-

work. With them he won great battles, both for country and for his ideals."

President Harry S. Truman wired from the White House:

"I can think of no more fitting tribute to the memory of General George S. Patton than the bestowal of his honored name upon the academic building of The Cavalry School.

"A brave and gallant fighting man, his memory will be an inspiration to all our soldiers through long decades to come. Please pay my tribute of respect to General Patton's valiant widow and to the other members of the family who mourn the loss of a loving husband and father."

Mrs. Patton spoke briefly before unveiling the shining bronze letters naming the building for her husband.

"This is the place of happy memories," she said. "In our 35 years of active service in the Army, Fort Riley has been the post nearest our hearts. There is not a corner of the reservation that we Pattons do not know and love."

Mrs. Patton recalled her husband's strategy as something "fresh as bread and as old as war."

"Four words define it," she said: "'Imagination—what would I do if I were the enemy. Reconnaissance—where is he weak, for it is there I shall strike him. Audacity—keep him off balance and keep him rocking. Pursuit—run him down.'"

"All these are Cavalry functions, and will be taught in Patton Hall, the home of the modern incarnation of the spirit of the Cavalry—going ever forward."

Special guests at the dedicatory exercises included Master Sergeant William G. Meeks, orderly for General Patton for eight years, who came here from Rome, Italy, and Staff Sergeant Paul Wiedorfer, Baltimore, Maryland, and Sergeant Davis E. Hardy, Richmond, Virginia, both former members of General Patton's famed U. S. Third Army.

Sergeant Wiedorfer is holder of the Congressional Medal of Honor, the nation's highest decoration for valor. He won the Medal of Honor for singlehandedly wiping out two German machine-gun nests on Christmas Day, 1944, which had pinned down his outfit near Chaumont, Belgium, in the historic Battle of the Bulge.

Among high military officers present were: Colonel Albert Le Bel, assistant French military attache, representing the French government, and Colonel Kenneth Mackessack, British military attache, representing Great Britain.

During the ceremonies, the Junction City High School a cappella choir sang "God of Battles," written by General Patton, and The Cavalry School Band played "The Second Armored Division March," written by Mrs. Patton.

General Jacob L. Devers and Major General I. D. White inspect the escort for the dedication of Patton Hall.

Fifth Army Transportation

*by Captain Cecil H. Scott**

WHEN the "push" started from Anzio, the transportation section of the U. S. Fifth Army really began to operate. The section at first had had very short turn-arounds from dumps to the forward area. When the army pushed through Rome, however, and kept gaining rapidly, Fifth Army transportation found itself faced with a long supply line over which the necessary gasoline, ammunition, rations, and equipment had to be moved regardless of the long distance back to dumps at Anzio and Naples.

At this time, base quartermaster truck battalions were located at Naples and Anzio. They were hauling supplies to new dumps located in and around Rome. Many times Fifth Army convoys were sent back to dumps at Anzio. During this time highways were crowded day and night. To handle this heavy flow of traffic and to keep supplies moving forward as fast as possible, the Fifth Army organized its truck battalions as follows: Each morning a report on the total number of trucks that could be operated for a 24-hour period was sent to transportation headquarters by all truck battalions, and all convoys were scheduled by transportation Movement Control. Convoy movement forms would be filled out with the following information: time of departure from battalion area; route to travel to dumps or railhead, and on to the dumps in the forward area. Transportation control points were set up along the main roads to check and control all convoys. Time for arrival and departure at these stations was entered on the Convoy Movement form. If a convoy checked in at a station early, it would be held up and put back on schedule. If it checked in late, it would be sidetracked, and Movement Control called for new time schedule for the remainder of the trip. In this manner all convoys were kept on schedule. Where possible main roads were kept open for loaded convoys. Empty trucks were routed back over secondary roads. Since Movement Control was in contact with all check stations, traffic could be kept moving on all roads. Movement Control was in a position to clear up jams by relieving pressure on any road using check stations to re-route convoys, or on all traffic if necessary.

The British Eighth Army, operating on the right, occasionally scheduled convoys through Fifth Army areas. This caused some traffic jams at first. Later, all British convoys were required to clear with Movement Control of the Fifth Army if they were traveling through a Fifth Army area. Generally convoys were scheduled to be away from their company area for as long as 30 to 40 hours. Some means had to be set up for refueling, checking trucks for flat tires and feeding drivers. Refueling points were established along the main highway; and time for stops was entered on convoy commanders' schedules. Messes were set up and operated by cooks drawn from the battalions concerned. Time was allowed for eating, and if necessary, changing flats. All drivers were briefed on the route to travel, time of departure from battalion area, and time of arrival at all check points. This was found to be of great importance. If a driver fell out of convoy he always knew where to go and how to get there. The convoy commander knew the cargo would get to its correct destination.

Highways in Italy were all built with very narrow shoulders. Where possible, trees had been planted 10 to 15 feet apart on both sides. If a truck was wrecked or broken down, it was almost impossible to clear the road for two-way traffic. To eliminate this, a wrecker patrol was organized. All main roads were patrolled day and night. If a truck needed only minor repairs it could be repaired on the spot; if wrecked it could be towed to its own area.

Truck operations were difficult in the mountains north of Florence. In the winter of 1944, ice, snow, and extremely cold weather were encountered. Wrecker stations were set up with wreckers and snowplows available on call. These stations were furnished the schedules of all convoys coming through. If a convoy failed to show up, the operator called back to the next station to see if it had cleared the convoy through. In this way a convoy would be halted only a short time before help arrived. When troops were to be moved, strict control of highways could be maintained, and troops went through without a hitch.

Trucks returning from long trips over rough roads were found to have loose bolts. Spring U-bolts were constantly working loose causing them to break. In order to insure that all bolts were checked after each trip, First Echelon maintenance check-teams were trained in each company. A team consisted of one sergeant and three privates. Regardless of the time a convoy returned, a team checked each truck over a grease pit or rack. They tightened spring U-bolts, propeller shafts, universal bolts, all body bolts, and the nuts on all gear boxes. The team was responsible for greasing each truck and checking lube in all gear boxes. With trucks checking in at all hours of the day and night, the team proved to be of great help in checking and servicing the vehicles and in putting entire convoys of 20 to 30 trucks back on the road in less than two hours.

In truck operation during a push, it is the number of trucks on the road that count, not the ones in second, third and fourth echelon shops. With these vehicles traveling an average of 150 to 200 miles each 24 hours, it is very important that convoy speeds be controlled and first echelon maintenance be performed regularly.

*Department of Motors, The Cavalry School.

The ARMORED SCHOOL

THE World War I action of Cockcroft at Ypres, the cracking of the Hindenburg Line at Cambrai, and successes of German armor in Poland and the Low Countries in World War II, all served to center the attention of military leaders on the importance of armor in modern warfare.

Cognizant of the need for a school where the teaching of armored tactics and developments could be focused, General Adna R. Chaffee, on July 27, 1940, directed the organization of the Armored School and Replacement Center at Fort Knox, Kentucky.

On its activation, The Armored School had as its nucleus the 7th Cavalry Brigade, Mechanized (Reinforced) school (which became the 1st Armored Division School in July 1940), and the tank section of The Infantry School.

With these elements, which had been in existence for years, The Armored School expanded concurrently with the growth of the Armored Force. The first students were received November 4, 1940, and although the annual output of the School was originally 8,000 officers and enlisted men, within two years 38,000 officers and enlisted men were trained yearly.

Expanding rapidly, the School became the largest of its kind in the world, with over 500 buildings and equipment evaluated at over $20,000,000 and encompassing in its reservation some 50,000 acres of land upon which are gunnery and driving ranges, as well as combat and demonstration areas.

By April 1946, The Armored School had trained 12,074 officers, 12,180 officer candidates, and 69,764 enlisted men, for a total of 94,018 students. Unit after unit, from the 1st Armored Division to the 20th Armored Division and the many separate tank battalions, all had in their organization alumni of The Armored School.

On the inactivation of the Tank Destroyer School in November 1945, The Armored School incorporated tank destroyer courses in its curriculum.

The Armored School today has three main divisions: the Administrative Division, consisting of The Commandant, his staff, and the Training Group, the latter being the housekeeping unit; The Armored School Troops, consisting of tactical units which furnish demonstration troop requirements for student classes; and the Academic Group, consisting of the academic departments and agencies.

The Academic Group operates under the guidance of the Assistant Commandant and is responsible for all instruction and student administration. The actual instruction of students is given by trained officer and enlisted instructors, a vast majority of whom have had armored combat experience on the battlefields. Each instructor is fully trained in the principles of teaching before he is given actual teaching duties.

Each academic course is designed to fill a particular need of armored units. They consist of specialized courses in various departments, and integrated courses whereby the student receives instruction in several categories. The integrated courses include: Officer Candidate School, which prepares officer candidates for their duties and responsibilities as officers with armored units; the Armored Officers Course, which prepares armored officers for their duties as company or battalion commanders and as members of the battalion, group or combat command staffs; and the Armored Noncommissioned Officers Courses, which prepares selected enlisted personnel for tactical and general administrative duties within the company.

Considered as special subjects are those integrated courses which have a duration of one month or less. Among these are: Professor of Military Science and Tactics, for the training of selected personnel for duty with university ROTC units; Prisoners of War, for orientation of returned officer prisoners of war on the present status of armor; National Guard Officers and Noncommissioned Officers, for training as instructors of National Guard Units. Other special courses are offered from time to time for the instruction of selected groups, and are highly specialized.

The academic departments which make up the Academic Group are: Communication, Full-Track, Wheeled-Vehicle, Weapons, Tactics, General Instruction, and Training Literature and Reproduction.

Communication Department

The Communication Department offers instruction for specialized communication courses and generalized instruction for the integrated courses. In officers' courses, the objective is to familiarize the student with the general principles involved, in order that he, as a commander of a unit, may have a working knowledge of the capabilities and limitations of his signal communication personnel and equipment. In the instruction given to officer candidates and noncommissioned officers, the objective is to familiarize them with their duties as platoon commanders, insofar as signal communications are concerned. In these courses, all essential elements of signal communication are covered with the emphasis needed placed on various phases, as: radio operation and voice

procedure, wire and visual communication, and the practical application of communication security and combined communications.

Whenever practicable, officers and enlisted men function in their respective capacities during practical field work in order to train them for coördinated teamwork within their organizations. Particular emphasis is placed upon training personnel to act as instructors when they return to their units.

Full-track Department

In the Full-Track Department the 1st and 2d echelons of the Army system of maintenance are taught to both officer and enlisted student personnel. The courses are composed of mechanical rather than engineering subjects with a view to standardizing the basic mechanical practices involved in the maintenance of the full-tracked vehicles employed by the various arms of the Army Ground Forces.

Courses taught in this department are designed to teach students to supervise properly the 1st and 2d echelons of maintenance that should be performed by the troops in their charge. Familiarization with the various basic types of tracked-vehicles and their characteristics, capabilities, and salient maintenance needs are taught, and "Before," "At Halt," and "After Operation," preventive maintenance practices are emphasized. Importance is placed on leadership and methods of instruction in order that the student can act as an instructor in his unit.

General Instruction Department

The General Instruction Department is divided into the Instructor Training, Map Reading and Field Engineering, Night Vision Testing and Training, and Administrative Subjects Divisions.

The Instructor Training Division teaches the "methods of instruction" which include the principles of learning, preparation and presentation of subject matter, test construction and evaluation, and practice teaching. This division also conducts a course in leadership, and trains all newly assigned instructors of the school.

The Map Reading and Field Engineering Division teaches map reading, aerial photograph interpretation, and pioneer engineering.

The Night Vision Testing and Training Division conducts classes in the theory of night vision and the practical application of this science.

The Administrative Subjects Division conducts training in company administration. The courses are comprehensive reviews of the administrative procedures within the company. They enable the students to understand more fully many administrative problems which arise within the company and to cope with these problems more effectively. Clerical courses for enlisted students are also given in this division, which include the study of typing and shorthand.

Tactics Department

The Tactics Department offers only phases of the integrated courses of the School curricula. Courses are divided in scope dependent upon the purpose of the course and experience of the student.

Instruction is given in combat intelligence; tactics and technique of light, medium, and heavy tanks armed with 75mm, 76mm, and 90mm guns; tactics and technique of small arms to include the cal. .50 machine gun; tactics and technique of the armored section, platoon, company, and battalion in all types of operations including their part in the Infantry-Artillery-Tank-Air team; scouting and patrolling; reconnaissance and security; orders and messages; organization of armored units; supply and evacuation; marches; tactical employment of units, alone and with other arms; air-ground liaison and coöperation; the evolution of tactics and the effect of modern means and methods thereon. In conjunction with School troops a large part of this instruction is carried into the field where the student "learns by doing."

Weapons Department

The Weapons Department provides instruction in the care, operation, mechanical functioning, marksmanship, and service firing of all weapons used by armored units. Officer students are trained to become qualified instructors in these subjects. They are provided with a comprehensive, direct fire tank gunnery course and familiarization with the latest tank weapons and tank indirect fire procedures. Enlisted students are trained to become qualified assistant instructors or armorers and artillery mechanics. Officer candidates are provided with instruction not only in technical data but also regarding their prospective duties as a company officer, relative to training tank crews in care and manipulation of weapons.

Wheeled-Vehicle Department

The Wheeled-Vehicle Department trains maintenance officers and enlisted automotive mechanics. Training includes a comprehensive review of the Army system of maintenance with detailed study relative to the 1st and 2d echelons of maintenance of wheeled- and half-track vehicles. Officers and enlisted men are trained in automotive mechanics, each for his particular type of duty regarding the supervision for correct operation, care, and preventive maintenance. In all of these courses basic instruction is given in the armored maintenance systems, principles of engine operation, fuel and electrical systems, chassis units and suspension systems, forms and records, inspections, and driver selection and training. The emphasis or elaboration of a particular subject is made dependent upon the type class being taught. Stress is placed on leadership and methods of instruction so that each student upon return to his unit may act as an instructor.

Training Literature and Reproduction Department

An integral, though comparatively inconspicuous branch of The Armored School is the Training Literature and Reproduction Department. Here skilled artists, draftsmen, photographers, linotype operators and printers perform the technical functions that are necessary to the production of a mass of instructional material.

A staff of experienced editors in this department review, edit, and rewrite lesson plans, field manuals, technical manuals, examinations, training schedules, and similar material. Here, all charts, maps, overlays, photostats, diagrams, and sketches used in Armored School instruction are produced. In the printing plant of the department three offset presses and five smaller platen and direct presses produce huge quantities of material for the School, as well as for Army Ground Forces and components of the Fifth Service Command.

Recently this department also assumed responsibility for the editing and administration of Army Extension Courses prepared by personnel of the School.

Training Group

The Training Group, part of the Administrative Division, has an important rôle in the smooth functioning of the School. It is an administrative and housekeeping organization and is responsible for the billeting, rationing, and administration of the enlisted personnel of the School. It also houses and rations both officer and enlisted students, and supervises the bachelor officers' quarters and messes operated for the assigned officer personnel of the School. The Training Group is composed of the Instructor Battalion, the Student Battalion, the Student Officer Company and the WAC Detachment.

Armored School Troops

The Armored School Troops consisted initially of a number of Table of Organization units and the Demonstration Regiment. These units were originally assigned to the School, placed under this headquarters and began to function with the dual mission of performing school assignments and carrying on unit training. Many of the units used by School troops have been completely trained and engaged in actual combat. Also many trained units were transferred to other continental stations, or in some cases, were inactivated and used as replacements. Troop requirements, ranging from a driver operator with a quarter-ton truck and radio, up to exercises involving three or four armored battalions, with supporting arms and services, have been requested for school demonstrations. These troops are used to illustrate the employment of all basic Ground Force arms: tanks, field artillery, tank destroyers, infantry, cavalry, and engineers. The culmination of classroom instruction is the practical work wherein the student "learns by doing." The officer candidate and officer students learn to drive armored vehicles on various types of terrain. Tactics are studied by observing actual troops on the ground. Details of arranging infantry-tank, tank-artillery, and infantry-engineer coöperation are worked out by the students, who take over command and staff positions and put their plans into effect on the ground. Using radio equipment organic to armored units, OPs are set up and manned by students studying staff procedure. The use of camouflage, the methods of mine-field laying and removal, and the use of screening smoke are observed under field conditions. In short, Armored School Troops take the instruction to the field.

Book Department

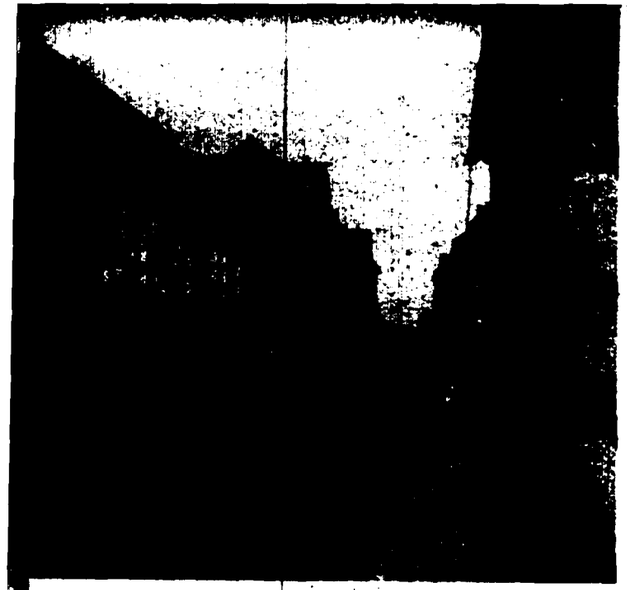
In addition to the aforementioned departments, the School also operates the Book Department, consisting of the Library and Book Shop. The shelves of the library hold a collection of 7,000 volumes, largely pertaining to military subjects and to the technical aspects of Army equipment. It also maintains a file on pertinent Field and Technical manuals, War Department circulars, and Army Regulations. The library obtains the latest books and subscribes to all the service periodicals and the New York *Times*, making it a source of reference material for assigned and student personnel of the School.

The Book Shop operates a main store and a branch store, which stock for sale those materials and supplies which are not items of issue but are aids for students, instructors, and assigned personnel in the performance of their duties. It also carries for sale War Department publications, nonmilitary textbooks, and Army Ground Forces approved School publications. It is prepared to secure, at the most reasonable cost, any text or publication desired by students or instructors.

Through this integrated network of departments, The Armored School has functioned, since its inception, as the training ground of American armor and armored personnel.

The postwar aim of The Armored School is to offer to its students the latest in armored developments and tactics, and the application of lessons learned in World War II.

With a life span of only five and one-half years, it must be admitted that The Armored School has accomplished educational procedures outstanding in military history. Successes of American Armor in World War II attest to the efficiency and well-founded principles taught at The Armored School.



Tanks, jeeps and other vehicles of the 9th Armored Division, U. S. First Army, make a brief stop in Carweiler, Germany, before pushing on to their next objective. 1945.

Men of the 11th Armored Division fire from behind one of the division's tanks on the town of Kepple, Austria.

U.S. ARMORED DIVISIONS IN WORLD WAR II

(To be continued)

Signal Corps Photos

A combat command of the 12th Armored Division, the 43d Tank Battalion's Company B, Seventh Army, drives toward Nurnberg, birthplace of Nazism. Here the column waits by a woods for the completion of a near-by by-pass.

A tank of the 10th Armored Division, of the Seventh Army, enters Rosswalden, Germany. Civilian at right prepares to put water on her home, set afire by other tanks.

TOP SECRET. By Ralph Ingersoll. Harcourt Brace and Company. $3.00.

After seeing experience in North Africa, Ralph Ingersoll went to England in the spring of 1943, as a staff captain in the infant American Army. From then on he served in the strategic and tactical planning sections of a number of senior commands, rising to the rank of lieutenant colonel. For some months before and immediately after the invasion he was an American observer attached to General Sir Bernard Montgomery's staff. From the battle of St. Lô on, he was in the plans section of General Omar N. Bradley's field headquarters. Throughout the campaign in Europe he did liaison work between the staffs of Bradley, Montgomery, and Eisenhower. He took part in the D-day assault in Normandy; other times he was attached to combat commands where he was able to observe the results of high strategy at the fighting front.

And from this experience, he draws his uncensored, inside story of how the generals planned and ran the invasion of Germany. Beginning in London a year before D-day with the conflict between the Americans and British over whether or not there should be an invasion of France, it is a behind the scenes narrative of the great events of our war in Europe as seen from the map rooms of the planners and trailer headquarters of the top field commanders.

Falling in with the trend toward telling the story of each top-flight General in his turn, Ingersoll has made General Omar Bradley the hero of his story. As has been the case with the other writers and their heroes, the author contends that Bradley was perhaps most responsible for Allied victory. This time alone will tell, but the important thing is, the Public is offered an inside view into the life of one of the ablest commanders in American history. In addition, *Top Secret* is a record of personal and national conflicts behind the front of Anglo-American collaboration, written with neither political axe to grind nor official record to uphold. It is a book you will surely want to read and own.

✓ ✓ ✓

CORAL COMES HIGH. By Captain George P. Hunt, USMCR. Harper & Brothers. $2.00.

Within the limited pages of Capt. Hunt's story is an itemized bill of what one bleak patch of coral in the middle of the Pacific costs, and this is a minor item in the "blood, sweat, and tears," shed during this war. 48 hours of combat on Peleliu—48 pages of personal glimpses of the heroism, bravery, and self-sacrifice of Capt. Hunt's company which tell of the heavy casualties sustained in a seemingly hopeless position.

This story is told in a simple style that somehow makes its dynamic happenings stick in the mind, and, as is typical of brave men, the author tells in matter-of-fact language of the casualties along the beach sector: "Another explosion and whine—hope that one got a couple of 'em—I had seen Bennett very solemnly sitting in a shell hole looking at a picture while bullets were clipping the brush around him.

'What are you doin'?' I asked him.

'Lookin' at my wife's picture. Wonderin' if I'll ever see her again.'"

George P. Hunt served in the 1st Marine Division in the South Pacific and was decorated with the Silver Star and the Navy Cross, the latter for his part in the action described in this book. A graduate of Amherst College he is now a writer on the staff of *Fortune* Magazine.

This is the story of fighting men told by a fighting man. After reading it you will agree that "coral comes high."

✓ ✓ ✓

WORLD WAR II: A CONCISE HISTORY. By Roger W. Shugg and Major H. A. DeWeerd. Infantry Journal Press. $3.00.

World War II: A Concise History is offered to Americans as a brief but complete history of the war to VJ Day. Students of history as well as the general public will welcome this book as an aid to completing their mental picture of what happened in this the greatest war of all time. It is a complete battle-by-battle account, largely military but not technical in language. Though it is not a book to be read for pleasure, it is excellent for study and reference.

✓ ✓ ✓

AND ANOTHER THING. By Howard Spring. Harper & Brothers. $2.50.

"What an unaccountable thing human memory is! It is stuffed with unrelated odds and ends, matters of no significance or value, and these will not depart to make room for all the great moments, the vital experiences, as we choose to consider them, that we would gladly remember." And thus Howard Spring opens his latest book, aptly described as "random reflections." How else could one describe this work that deals with autobiography, reminiscence, literary criticism, theology and philosophy, war and pacifism, passing from one thought to another just as the human mind will when given free rein to wander. This original purpose of the author, to let the mind wander from thought to thought drawing from each its true essence, is accomplished in a clear, simple style with a beauty that sometimes haunts the mind.

The title of this book is, indeed, one to capture the imagination and the reader will not be disappointed in the perusal of this new and unique writing.

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WILLIAM BANCROFT MELLOR

The story of the most colorful general of World War II. A biography that every cavalryman will want to own.

$3.00

MY THREE YEARS WITH EISENHOWER. By Captain Harry C. Butcher, USNR. Simon and Schuster. $5.00.

General Eisenhower's Naval Aide, Captain Harry Butcher, kept a diary which is more than one man's personal diary; it could have been written only by a man who lived with Eisenhower day and night and acted as personal friend and confidant. In his introduction, Captain Butcher writes, "I wish to make it clear to the reader that this is my responsibility and not General Eisenhower's. Yet I like to think that, although I wrote this book, General Eisenhower lived it."

This book is a new kind of history written in the midst of mighty happenings as they were occurring. It will, no doubt, become a source book for historians in years to come, because it is an authentic account of the North African invasion, the cross-channel invasion, and the final disintegration of the German armed force. Yet it is more than history; it is a backstage account of a great drama, revealing intense human interest, grand strategy, and intimate glimpses of key members of the Allied family.

Of the author's style, it may be said that it is simple, as may be expected of a diary, yet it never fails to hold the reader's interest. The book contains authentic pictures and maps; it is well indexed; its 900 pages are packed with interesting, epoch-making events and delightfully human trivia; in short, it is well worth the reader's time, a welcome addition to any library, and a book that the military man of today will surely want to own.

* * *

BASTOGNE: THE FIRST EIGHT DAYS. By Colonel S. L. A. Marshall, assisted by Captain John G. Westover and Lieutenant A. Joseph Webber. Infantry Journal Press. $3.00.

Many stories of combat told by a man who "was there" when it happened, have been written, and still another of these is Colonel Marshall's on-the-spot story of one of the most famous and most bitter fights of World War II in the European Theater. His story is based on material gathered firsthand by an Army historical unit, the men of which were actually present in Bastogne during the fighting. To lend clarity and interest to the text, the book is illustrated by ten drawings, sketched from life, 24 maps, and 32 pages of pictures. In addition the end papers are a reproduction of the famous "Christmas Overlay"—a kind of military map which carried simultaneously information of the enemy and Christmas Greetings to the defenders of Bastogne.

Of *Bastogne*, *The New York Times Herald* says: "What Colonel Marshall has set down is the story of how armor, artillery and infantry of many different units—the famous 101st Airborne Division was by no means alone—were welded into a fighting team for the defense of Bastogne. It is the story of how this team, with skill, determination and confidence, stood its ground and did a difficult job in some of the darkest days of the war. Colonel Marshall's book should be excellent source material for historians, but it is rough going for the general reader."

STRATEGY OF THE CIVIL WAR. By Barron Deaderick. Military Service Publishing Co. $2.50.

Barron Deaderick, born near Memphis, Tennessee at the close of the Civil War, early in life became interested in a study of history and military campaigns. He was long associated with the Sons of Confederate Veterans as Historian-in-Chief and thus enjoyed ample opportunity to study and analyze the basic principles of strategy employed by the Confederate and Union commanders. This abundant source material for a study of the principles of war has been liberally drawn upon in *The Strategy of the Civil War*.

The author's object is to analyze and compare the application made by both Union and Confederate commanders of the basic principles of strategy. To attain this object, he deals with each battle and its officers in such a way that both military and lay readers will find it interesting. Added interest is furnished by his maps of the territory surrounding the battle grounds.

In short, here is a brief, concise and interesting study of the Civil War.

* * *

SCIENCE YEAR BOOK OF 1946. Edited by J. D. Ratcliff. Doubleday & Company, Inc. $2.50.

Here is the fifth in Mr. Ratcliff's series of Science Year Books providing an intriguing compilation of the best in scientific articles of the year. Divided into four parts, Physics and Chemistry, Medicine, Agriculture, and Aviation and other Sciences, the book contains such titles as "The Atomic Age Opens," "Chemical Magic," "Atomic Power," "The Immediate Future," "Cancer: Notes of Hope," "Radio Telephones for Everyone," and "Long-Range Weather Forecasting" and many more. In addition Mr. Ratcliff's introduction covers scientific advances not discussed elsewhere in the book.

Here are the scientific marvels of the year summed up in one interesting and intriguing volume for the lay reader, which with the previous volumes, will constitute a valuable reference library.

* * *

LANDING OPERATIONS FROM GRECIAN DAYS TO 1945. By Dr. Alfred Vagts. Military Service Publishing Company. $5.00.

This book covers the entire history of landing operations from the earliest recorded ventures of the Greeks to 1945. World War II produced the greatest series of landing operations the world has ever seen. Doctor Vagts analyzes all phases of the tremendous problem and correlates the lessons provided with the history-making operations of the war waged by the Allies and the Axis.

To those interested in military strategy and landing operations in particular, the title speaks for itself. The story of landing operations from beginning to end is set down in one complete and interesting volume.

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HARD POUNDING. By Lt. Col. G. D. W. Court, M.C., Royal Artillery. U. S. Field Artillery Association. $2.50.

Here is a book dealing with the tactics and technique of antitank warfare. It discusses the theory of fighting tanks, reviews the antitank tactical and technical developments from World War I through World War II, continues with the tactics of tank destroyers and antitank guns, and, finally, summarizes tank destroyer and antitank organization. It contains three appendices dealing with German, Russian, and Japanese antitank tactics and a fourth devoted to Infantry antitank training. Also of interest are more than seventy illustrations pointing up the important tactical and technical points of tank "killing."

This is a book that will not only make interesting reading for the military-minded man but will also be treasured as a valuable reference book.

AMERICA IS IN THE HEART. By Carlos Bulosan. Harcourt, Brace and Company. $3.00.

Carlos Bulosan had dreamed since early childhood, when his older brother came home from serving with the American army in World War I, of the day when he would leave his native village of Binalonan, on the island of Luzon, and go to the shining land of America. In realizing his dream Carlos meets with bitter disillusionment and betrayal, yet holds his faith in America. Because he believed so stubbornly in America, he has finally found her—"in the heart."

The book is interesting from its beginning in Binalonan where the Bulosan family struggled to eke out an existence from the soil and educate Macario, an older brother of Carlos; through the struggles and disappointments of the young immigrant in America; to its end when Carlos realizes success with his pen. This is a sometimes tragic but always brave story written with the oblique humor and tenderness which marked his former book, *The Laughter of My Father.*

ROBERT E. LEE IN TEXAS. Carl Coke Rister. University of Oklahoma Press. $2.50.

Much has been written about the great Confederate General, Robert E. Lee, but Carl Coke Rister introduces a little known phase of his career—his service in Texas during the turbulent years preceding the Civil War. In reading this book, one goes with Lee to his lonely border posts and sees through his eyes the raw life of the frontier sharing with him the hazardous chases for Mexican bandits and renegade Indians. Lee worked with, and for the most part commanded, the famous Second Cavalry; and there is no doubt that his Texas experience served him well when, in 1861, he returned to Washington prepared to assume the rôle of the South's peerless leader.

This is a very welcome addition to the writings concerning General Robert E. Lee.

I SEE THE PHILIPPINES RISE. By Carlos P. Romulo. Doubleday & Co., Inc. $2.75.

"Again let me explain I am not writing history. This is not a military account of the release of the Philippines. It is the sequel to the book, *I Saw the Fall of the Philippines,* which was a journalist's account of the tragedy that had overwhelmed his country, written while he himself was still ravaged, mentally and physically, by war." So writes Carlos P. Romulo of his story of the liberation of the Philippines. In a simple, clear, but moving style he tells of his efforts for his country in the United States while his heart was with his people and his family in his fallen homeland, and of his one hope and desire for the day when, with MacArthur, he would return. He takes the reader with him to Hollandia, Leyte, Manila, Bataan, and Corregidor; warms his heart with the account of his reunion with his family who had survived three years of guerrilla living in the hills; and ends with a triumphant hope for a new nation and a new freedom in the Philippines.

This book is more than General Romulo's story; it is the story of the Philippine people, of their dauntless spirit, of the problems they have overcome and the problems they have yet to face, written in a simple, yet heart-gripping style, which will hold the reader's attention from beginning to end. You surely will not want to miss this great drama of the Pacific war.

PATTON AND HIS THIRD ARMY. By Col. Brenton G. Wallace. The Military Service Publishing Company. $3.00.

This is the story of the Third Army in Europe and its leader General George S. Patton written by a member of Patton's staff. Having attended Patton's daily staff meetings, Colonel Wallace has written an almost official account of the Third Army's victorious march across the beaches, through the bottleneck at the Avranches, through France, Luxembourg, Belgium and Germany. While the book is not a biography, it contains many personal glimpses of Patton, the General, and recounts many of the famous Patton "incidents" at firsthand.

For years to come the campaigns of the Third Army and the decisions of its commander will be models of military operations, and this book will take its place among the many accounts that together will give the complete history.

DUNGEON DEMOCRACY. By Christopher Burney. Duell, Sloan & Pearce, Inc. $2.00.

Mr. Burney, having lived in the concentration camps of Germany, had ample opportunity to get acquainted with the Nazis' prison system and its vastly assorted inmates as well. This is not a story of the horrors of Buchenwald, though they inevitably appear, but rather an analysis of the so-called "democracy" of the camp—the system of government—and a study of the inmates of various nationalities who were his co-sufferers.

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