thus exposed.[19] Consequently, before a tank could protrude its guns and advance through a hedgerow, it was necessary for accompanying engineers to blast a hole through the hedgerow wall and open a passage for the tank. The explosion immediately attracted German attention to the point where armor was to breach the hedgerow, and enemy antitank weapons were not slow in covering the new opening.

The old sunken roads between the hedgerows were another hazard. So deep that they screened men and light vehicles from observation, these lanes, one observer said, "might have been made for ambush." [20] The highways of the region, narrow tarred roads, were adequate for mechanized forces, but the hedgerows that lined them gave excellent concealment to hostile troops.

The fields were so small and the hedgerows consequently so numerous that the opposing forces fought at close range. U.S. troops armed with the M1 rifle, a weapon more effective at long ranges, were somewhat at a disadvantage. Submachine guns, more useful for clearing hedgerows at short ranges, and rifle-grenade launchers, particularly suitable for firing over the hedges at short distances, were in too short supply to be made available to all troops. There was also a shortage of white phosphorus shells, effective in clearing hedgerow corners of enemy strongpoints.[21]

A serious hindrance to American operations in hedgerow country was the lack of observation posts in the flat area of irregularly shaped fields, where it was impossible to anticipate the pattern of the hedgerow enclosures. Hedgerows and fields all resembled each other. There were few terrain features to serve as general objectives, as geographical markers, or as guiding points for small units. Consequently, small units had difficulty identifying their map locations with accuracy. Directional confusion often existed. Constant surveillance and frequent regrouping were necessary to maintain correct orientation.

Because the Germans occupied superior terrain in the surrounding *bocage,* American offensive movement brought immediate enemy artillery and mortar fire, deadly fire that had been carefully registered in advance. American counterbattery fire was difficult, for the hedgerows limited observation and prevented accurate adjustment of fire from the ground. Scaling ladders were in demand to place observers in trees, but forward observers were loath to climb trees for vantage points because of the danger of being shot by nervous Americans (many Americans were not yet experienced in battle and tended to be overalert to the possibility of enemy snipers). So extreme had this situation become in June that one division forbade its troops in the rear of the assault elements to fire into trees unless a hostile act had been committed; the division

[19] There was feeling in some quarters that the lack of emphasis on hedgerow operations during the preinvasion period had prevented the development of an infantry support tank heavily armed in front and in the bowels. Interv, Col C. H. Bonesteel, III (formerly in the 12th AGp G–3 Plans Sec), 18 Jun 47, Washington, Pogue Files.

[20] 314th Infantry Regiment, *Through Combat* (Germany, n.d.), an unofficial history, p. 18.

[21] First U.S. Army, *Report of Operations,* I, 80; FUSA (Ord) Ltr, Supply of WP for 105-mm. and 155-mm. howitzers, 1 Jul, FUSA G–3 Jnl File.

recommended that forward observers place red streamers in the foliage and a guard at the base of any tree they used for observation purposes.[22] Small cub planes, organic equipment of artillery units, were excellent for reconnaissance, observation, and adjustment of artillery fire, but rain and overcast skies frequently kept them grounded in the Cotentin.

Another complication was the general absence in combat units of smooth-working tank-infantry-engineer-artillery teams. Preinvasion training had not developed such teams, and instructions during combat, however exact, could not produce proficient units in short order.

The most obvious weakness of the American ground attack during June was the tank-infantry team. Many infantry commanders did not know how to use tanks properly in support, and many tank commanders did not realize how best to render assistance in a given situation. "The development of operational procedures and techniques between the infantry and close support tanks must not be left until the arrival in the combat zone," an army report stated, but that was the situation exactly.[23] The infantry divisions had not had sufficient training with separate tank battalions, even though the latter units were normally division attachments. To remedy this situation, a tank battalion attached to a division in Normandy continued, insofar as possible, to be associated with that division throughout the campaign. Eventually, this developed mutual confidence and an awareness on the part of both of the individual peculiarities, the limitations, and the strengths of each. By the beginning of July, sufficient time had not elapsed to produce smoothly functioning tank-infantry teams.

The greatest problem in achieving adequate tank-infantry co-ordination was that of communication. The difficulty of on-the-spot co-ordination between an infantry platoon leader taking cover in a ditch and a commander buttoned up in his tank was a continual complaint that plagued the operations of tank-infantry teams, a universal problem not limited to Normandy.[24] Because voice command could not always be heard above the sounds of battle and the noises of tank motors, hand signals had to be worked out and smoke signals and pyrotechnic devices prearranged. Riflemen guiding tanks sometimes had to get in front and jump up and down to get the attention of a driver. Eventually a tanker would stick his head through a turret hatch and take the message.[25] Because armor and infantry radios operated on different channels, division signal companies in Normandy installed in the tanks infantry-type radios that could be tuned to the infantry radio net. To avoid the frustration that sometimes compelled infantrymen to pound their fists on tanks in vain efforts to claim the attention of tankers peering through tiny slits, Signal companies attached to the outside of tanks microphones or telephones connected with the tank in-

[22] Maj Gen Leonard T. Gerow to Gen Bradley, 0905, 27 Jun, and 90th Div Operational Memo 8, 2 Jul, FUSA G–3 Jnl File.

[23] First U.S. Army, *Report of Operations*, I, 121–22.

[24] See, for example, John Miller, jr., *CARTWHEEL: The Reduction of Rabaul*, UNITED STATES ARMY IN WORLD WAR II (Washington, 1959).

[25] See CI 47 (8th Div).

tercommunication system. Nevertheless, the development of smoothly functioning combinations had to attend the evolution through combat of elements accustomed to working in unison in mutual confidence and with a minimum of overt direction.[26]

While infantry platoons trained with tanks as much as possible in Normandy, engineers made up explosive charges to blast tank-sized openings in hedgerows. Engineers in those divisions facing water obstacles assembled sections of bridging for future river and canal crossings. Above all, commanders tried to indoctrinate the individual soldier with the idea that continuous and aggressive advance was the best assurance of safety in the hedgerow terrain.

At the beginning of July, those Americans who had fought in the hedgerow country during the preceding month had no illusions about instituting a major drive through that type of terrain. Added to the difficulties of the terrain was the weather. In June clammy cold rain had kept the swamps flooded, slowed road traffic, neutralized Allied air superiority, concealed enemy movements and dispositions, and left the individual soldier wet, muddy, and dispirited. During the first weeks of July almost incessant rain was to continue.

In addition to problems of terrain and weather, Americans were facing a meticulous and thorough enemy, troops well dug in and well camouflaged, soldiers holding excellent defensive positions. Bolstering the defenses were tanks superior in protective armor and in fire power to those available to the Americans.

The German tank employed in large numbers in western Europe was the Mark IV, a medium tank of 23 tons with a 75-mm. gun.[27] The standard combat vehicle of tank battalions in armored divisions, it presented no frightening aspect of invulnerability. The Mark V or Panther, on the other hand, weighing 45 tons and carrying a high-velocity 75-mm. gun, had appeared in Normandy during June in limited numbers and with good effect. Panthers were beginning to be distributed to tank battalions organic to armored divisions. Although the Allies had not yet made contact in Europe with the Mark VI or Tiger, knowledge acquired in North Africa of its 56-ton weight and 88-mm. gun was hardly reassuring. This tank was reserved for separate battalions distributed on the basis of one to an armored corps. Reports of a modified Mark VI, the King or Royal Tiger, weighing 67 tons, mounting an improved 88-mm. gun, and be-

[26] First U.S. Army, *Report of Operations*, I, 121–22; see Robert L. Hewitt, *Work Horse of the Western Front, the Story of the 30th Infantry Division* (Washington: Infantry Journal, Inc., 1946) (hereafter cited as Hewitt, *Story of 30th Division*), pp. 21–22.

[27] The following is based on Colonel C. P. Stacey, *The Canadian Army, 1939–1945* (Ottawa: King's Printer, 1948), p. 183n.; G. M. Barnes, Major General, United States Army (Ret.), *Weapons of World War II* (New York: D. Van Nostrand Company, Inc., 1947), *passim;* Constance McLaughlin Green, Harry C. Thomson, and Peter C. Roots, *The Ordnance Department: Planning Munitions for War,* UNITED STATES ARMY IN WORLD WAR II (Washington, 1955), Chs. X–XIII; Wilmot, *The Struggle for Europe*, pp. 294, 309; Ruppenthal, *Logistical Support*, I, 443; WD TM–E 30–451, *Handbook of German Military Forces* (Washington, 15 March 1945); *OKH Generalinspekteur der Panzertruppen Fuehrervortragsnotzigen, Band II, VI.–IX.44.*

ginning to appear in the west, increased Allied concern.[28]

In contrast, the heaviest British tank used in Europe, the Churchill, was not quite 40 tons, while the all-purpose Sherman, the American medium tank used by the British as well, weighed only 30. Most of the Shermans mounted the relatively low-powered 75-mm. gun at this time, although a few carried a 76-mm. gun or a 105-mm. howitzer. The primary weapon of the American light tank was the 37-mm. gun, although a few were beginning to be equipped with the 75-mm. gun.

Though German tanks were more heavily armed and armored than Allied tanks, they had the disadvantages of being less mobile and less dependable mechanically. Also, in contrast with Allied armor, they lacked a power-driven traversing turret; the German hand-operated firing turrets could not compete with those of the Allied tanks, but they were more than adequate for long-range action.

American antitank weapons and ammunition were not generally effective against the frontal armor of the heavier German tanks. It was necessary to attack enemy tanks from the flanks, and the restricted terrain and narrow roads of the hedgerow country made this difficult. Even from the flanks, American weapons were not wholly effective. Only the 2.36-inch rocket launcher, the bazooka carried by the individual soldier, could be employed with any hope of consistent success.

Although experiments were being made in the United States to improve the armor-piercing quality of ammunition, General Eisenhower in early July wrote to General George C. Marshall, Chief of Staff, U.S. Army, "We cannot wait for further experimentation." [29] The 90-mm. guns, organic at this time to the antiaircraft artillery gun battalions, seemed to offer a means to improve antitank defense and armor capabilities in the attack. But greater numbers of this weapon were needed, both for tank destroyers and for tanks. So urgent was this need that General Eisenhower sent a special representative to the United States to expedite not only delivery of the 90-mm. guns but also research on improved armor-piercing ammunition. At the same time, in the field General Bradley was attaching 90-mm. antiaircraft artillery gun battalions to ground combat elements for defense against armor, since the weapon of this unit was the only one "sure to penetrate" the front of the heavier German tanks.[30]

At the end of June the apparent superiority of German tanks seemed particularly serious. Searching for evidence of a forthcoming enemy counterattack against the Allied foothold, Allied intelligence estimated that 230 Mark IV, 150 Mark V (Panther), and 40 Mark VI (Tiger) tanks faced the Allies. To these could be added the tanks of three elite

[28] See XIX Corps AAR, Jul, for a descriptive sheet on enemy armor circulated to the troops. This sheet lists the dimensions of the enemy tanks and has photographs of the Mark IV and V. Opposite the Mark VI listing there is a large question mark and the inscription: "None met yet—will YOU get the first?"

[29] Ltr, Eisenhower to Marshall, 5 Jul, Pogue Files.

[30] Ltr, Gen Bradley to Maj Gen J. Lawton Collins, 6 Jul, FUSA G–3 Jnl File.

GENERAL HAUSSER

divisions assembling one hundred miles west of Paris—about 200 Mark IV, 150 Panther, and 80 Tiger tanks. These constituted a sizable armored force, especially if, as seemed likely, the Germans were to employ them in a massive counterattack.[31]

Impressed by the "formidable array" of German panzer divisions on the British front, eight definitely identified and more on the way, 21 Army Group warned that a "full blooded counterattack" seemed imminent. In agreement, First Army pointed to the British-American boundary and to the Périers–Carentan area as the two most likely places for an enemy counterattack.[32]

The First Army G–2, Col. Benjamin A. Dickson, was disturbed by the postponements of the First Army attack to the south in June. He felt that the *II SS Panzer Corps* (controlling the *9th* and *10th SS Panzer Divisions),* arriving in Normandy from the Eastern Front, might not be fully assembled by 1 July, but that it was certain to be entirely assembled two days later, when American operations in the Cotentin were scheduled to start. An immediate First Army attack, on 1 July, might force the commitment of the German armored units in defense rather than in a counterattack. Furthermore, a panzer division and two infantry divisions were moving into Normandy from the *Fifteenth Army* Pas-de-Calais area. If the Americans attacked at once, they might prevent the Germans from deploying these forces in orderly defensive dispositions. Other elements of the *Fifteenth Army,* still immobilized by the threat of FORTITUDE, could not possibly reach the First Army battle area by 1 July, but they might conceivably do so by 3 July. Finally, delaying the attack until 3 July allowed the enemy two more days to improve his positions, perfect his communications, and establish a sound supply situation in the "rather good natural defensive line" selected in front of the U.S. forces.[33] Despite these disadvantages of postponing the attack beyond 1 July, General Bradley's offensive was not to get underway for two more days.

This then was the situation of the U.S. First Army just before it began its July offensive, an attack pointed through a

[31] FUSA G–2 Per Rpt, 28 Jun.

[32] 21 AGp Div, M–505, 30 Jun; FUSA G–2 Est 7, 29 Jun.

[33] FUSA G–2 Spec Est 4, 29 Jun.

flooded pastoral region of ten thousand little fields enclosed by hedgerows. Through this region made for ambush, where the German defenders had dug into the hedgerow banks and erected strong defenses, the Americans were to fight from field to field, from hedgerow to hedgerow, measuring the progress of their advance in yards. Over it all a steady rain was to pour, and the odors of the Normandy soil were to mingle with the smell of decaying flesh and become part of the war.

German

At the beginning of July the Germans in the west were in the midst of important command changes. Generalfeldmarschall Guenther von Kluge, who had commanded an army group on the Eastern Front for two and a half years, was arriving to replace Rundstedt as commander in chief in the west. General der Panzertruppen Heinrich Eberbach, formerly a corps commander on the Eastern Front and an outstanding armor officer, was about to relieve Geyr as commander of *Panzer Group West*. Hausser, formerly commander of the *II SS Panzer Corps* had recently become commander of the *Seventh Army*, taking the place of Dollman, who had died of a heart attack. Of the high-ranking officers who had met the Allied invasion less than a month earlier, Rommel, commander of *Army Group B*, remained as the single veteran with experience against the British and Americans.

Deeply impressed by the Allied success and the German failure in June, Rommel felt that errors in tactical deployment and in handling reserves had

FIELD MARSHAL VON KLUGE

contributed to a large extent to the situation at the beginning of July.[34] He also believed that *OB WEST*'s lack of certain command prerogatives had been detrimental to the German effort; he recommended that *OB WEST* be given command over all the elements in the theater, including Navy and Air, "like Montgomery's" headquarters.[35]

Aware of Rommel's capacity for enthusiasm and despair, Hitler had alerted Kluge to the possibility that Rommel might be a difficult subordinate. But when Kluge visited Rommel soon after his arrival in the west, he found that they were agreed on the course of action

[34] The major source for this section is James B. Hodgson, Battle of the Hedgerows, R–54.

[35] Rommel Memo, 3 Jul, *AGp B Operationsbefehle 19.VI–31. VIII.44.*

to be followed: "Unconditional holding of the present defense line. . . . Improvement of the present lines forward, i.e. by attack after most careful preparation where it appears profitable. Fortification of the sector behind the front by all means available." [36]

The two sectors of the army group front were dissimilar. Eberbach, who had the mission of keeping Montgomery from getting across the Caen plain toward Paris, deepened the defense of *Panzer Group West.* He feared that if his troops occupied a shallow line of resistance in dense concentrations they would be destroyed by British artillery. He therefore planned to keep one third of his infantry on a lightly held outpost line and on his main line of resistance. The remainder of the infantry was to hold successive positions behind the main line to a depth of about 2,000 yards. Rear echelon troops and reserves were to construct alternate positions from 1,000 to 6,000 yards behind the front. These defenses, plus interlocking firing positions backed up by the antiaircraft artillery of the *III Flak Corps* in a ground role, were to prevent British armor from making a breakthrough. Behind the static defense positions, emergency reserves consisting of tank-infantry teams were to be ready to move to threatened points of penetration. Finally, if the British nevertheless broke through the defenses, panzer divisions in operational reserve were to be prepared to seal off the openings. This was deep-zone defense and effective utilization of resources for a defensive mission. During July, Eberbach was to attempt with partial success to replace his armor on the front with infantry units arriving to reinforce the sector.[37]

Hausser, in command of the *Seventh Army,* with fewer troops but better defensive terrain than Eberbach, organized what in comparison appeared to be a shallow defense. Behind the outpost line and the main line of resistance, both sparsely manned in order to bolster the reserves, the bulk of the troops were grouped into local reserves capable of launching counterattacks with the support of tanks and assault guns. Although Hausser's *Seventh Army* lacked the fire power of Eberbach's *Panzer Group West,* it had plenty of assault guns. Superior to tanks in fire power, they were effective weapons that Americans habitually mistook for tanks.

In the *Seventh Army* sector the Germans expected a type of combat they called "bush warfare." Battle in the hedgerows was to be fought according to the pattern of active defense. Anticipating that the Americans would advance in small parallel tank-infantry columns, the Germans planned to meet them by having a reserve commander lead his small unit in a counterattack against the American flank—if he could find it. "We cannot do better," the Germans reported, exactly as their American adversaries often stated, "than

[36] *OB WEST KTB,* 3 Jul; Memo for Record, 2 Jul, *Pz Gp W KTB, Anlage 35;* Min of Hitler Confs, Fragment 46, p. 3, published in Felix Gilbert, *Hitler Directs His War* (New York: Oxford University Press, Inc., 1950), pp. 102–04.

[37] Telecons, 1 Jul, *AGp B KTB;* Memo for Record, Rommel and Geyr, 2 Jul, *Pz Gp W KTB, Anlage 35;* Hitler Ltr of Instr, 8 Jul, quoted in full in Kluge Ltr of Instr, 8 Jul, *AGp B Fuehrerbefehle; Pz Gp W* SOP's, 6 Jul, *Pz Gp W KTB Anlagen 71* and *72;* MS # B-840 (Eberbach).

to adopt the methods of combat of the enemy with all his ruses and tricks." [38]

Because of the planning for offensive action in June, the bulk of German strength was still concentrated in the Caen sector under *Panzer Group West.* In comparison, the *Seventh Army,* with a defensive mission of preventing the Americans from driving south, was expecting the imminent arrival of a single armored division. The army had three relatively fresh infantry-type divisions four composite units of battered troops that were divisions in name alone, one detached parachute regiment, and three kampfgruppen. Of two sorts, kampfgruppen were mobile combat teams of regimental size formed from static of infantry divisions with organic or requisitioned transport to meet the crisis of the invasion, or they were improvised field formations used to organize remnants of combat units. The kampfgruppen in the *Seventh Army* sector at the beginning of July were of the first type; during July many were to become the second sort.

The *Seventh Army* had two corps, the *II Parachute* and the *LXXXIV.* The *II Parachute Corps,* which had moved from Brittany in mid-June, held a sixteen-mile sector between the Vire and the Drôme Rivers. Responsible for the St. Lô–Caumont area, the corps controlled two divisions and two kampfgruppen.

On the extreme left (west) of the German positions in Normandy, the *LXXXIV Corps* faced the Americans in the Cotentin. The initial corps commander, Marcks, had been killed early in June, and OKW had appointed Generalleutnant Dietrich von Choltitz to take his place. While Choltitz was traveling from the Italian front to take up his new post, General der Artillerie Wilhelm Fahrmbacher had temporarily left his corps command in Brittany to lead the *LXXXIV Corps* in the Cotentin. Choltitz assumed command on 18 June, and Fahrmbacher returned to Brittany.

Responsible for the area west of the Vire River to the Cotentin west coast, Choltitz in reality had two sectors separated by the Prairies Marécageuses de Gorges. A panzer grenadier division, reinforced by an infantry kampfgruppe and a separate parachute regiment, defended on the right (east). On the left, elements of five infantry divisions were deployed in an outpost position and on a main line of resistance. Desiring a deeper defense, Choltitz had on his own initiative delineated additional lines of defense in the rear, lines he had not divulged to higher headquarters for fear of appearing to controvert Hitler's instructions to hold fast. In the center and to the rear, a parachute regiment, under OKW control, constituted the corps reserve.

The strength of the German defenses in the Cotentin stemmed not so much from the quality or the number of the troops as from the nature of the terrain occupied. The soldiers of the static coastal divisions that had met the initial onslaught of the Allied invasion were older personnel, many of limited duty, equipped for the most part with a variety of weapons that were not the most modern. These units, as well as others that had arrived later, had sustained very heavy losses during the June fighting.

[38] Report of combat experience, *"Erfahrung der Panzer-Bekaempfung an der Invasionsfront Normandie," Sonderstab Oehmichen, z. Zt. Oberbefehlshaber West Ic/Pz. Offz.,* 25 Jun, *AGp B KTB Anlage,* 29 Jun; MS # B–731 (Fahrmbacher).

Yet the ground they held in the Cotentin was so favorable for defense that the Germans could look forward with confidence to the forthcoming American attack.

American preoccupation with Cherbourg in June and the German decision to contest not that main effort but the anticipated drive to the south had resulted in a two-week respite in the Cotentin that the Germans had used to advantage. They had fashioned a coherent defense.[39]

Despite excellent defensive preparations—Eberbach facing the British with a deep-zone defense, Hausser facing the Americans and utilizing the terrain to advantage—holding the line in Normandy was a gamble. As Rundstedt and Rommel had pointed out, if the Allies succeeded in penetrating the German positions, the absence of defensive lines between Normandy and the German border meant that the Germans would have to withdraw from France. Lacking mobility comparable to that of the Allies meant that the withdrawal would probably turn into retreat and rout. Yet the fact was that the German troops held the best positions they could hope for in France. The line was relatively short; the terrain was naturally strong; the battlefield imposed serious restrictions on Allied deployment. Only a small sector of open ground near Caen was difficult to defend. With reserves on the way, the Germans could reasonably hope to hold out until the decisive counterattack or the miracle promised by Hitler turned the course of the war.

[39] MS # B–418 (Choltitz); Dietrich von Choltitz, *Soldat unter Soldaten* (Konstanz–Zurich–Wien: Europa Verlag, 1951).

PART TWO

THE BATTLE OF THE HEDGEROWS