

The Germans expected an Allied invasion of the Pas-de-Calais because they believed that the Allied divisions still in the United Kingdom belonged to "Army Group Patton." They speculated that the future mission of these troops was an invasion of the Continent in the Pas-de-Calais area, this despite the fact that German intelligence rated the troops as capable of only a diversionary effort.<sup>50</sup>

"Army Group Patton" was in reality an Allied decoy, a gigantic hoax designed to convince the Germans that OVERLORD was only part of a larger invasion effort. Practiced under the provisions of Operation FORTITUDE, the Allied deception was effective throughout June and most of July. Naval demonstrations off the Channel coast, false messages intercepted and reported by German intelligence, and other signs of impending coastal assault kept the Germans in a continual state of alert and alarm and immobilized the considerable force of the *Fifteenth Army*.<sup>51</sup>

That Operation FORTITUDE was a powerful deterrent to committing the *Fifteenth Army* in Normandy was clearly illustrated by the fact that casualties among troops in contact with the Allies, which mounted alarmingly, were not promptly replaced. By the beginning of July, casualties were outnumbering individual replacements. Yet other factors also accounted for the growing short-

age of manpower on the Western Front, among them a complicated replacement system and difficulties of transportation.

German ground units on the Western Front consisted of a variety of types. The regular Infantry division, with between 10,000 and 12,500 men, had six battalions of infantry organized into either two or three regiments. The specialized static division of about 10,000 men, basically a fortress unit designed to defend specific coastal sectors, had a large proportion of fixed weapons, little organic transportation, no reconnaissance elements, and few engineers. The panzer grenadier division, 14,000 strong, was a motorized unit with one tank battalion and two infantry regiments of three battalions each. The armored division, with 14,000 troops, had two tank battalions; its armored infantrymen were organized into two regiments of two battalions each. The SS panzer division, with 17,000 men, had two tank battalions and two regiments of armored infantry of three battalions each. The Luftwaffe also had ground units because German industry could not manufacture enough planes for the manpower allocated and because Goering had ambitions to have a land army of his own. There were two types of Luftwaffe ground units, both somewhat weaker in fire power than the regular Infantry division. The parachute division had 16,000 paratroopers who were in reality infantrymen; the units accepted only volunteers who received thorough infantry training. The Luftwaffe field division, about 12,500 men, contained miscellaneous surplus personnel from the antiaircraft artillery, from air signal units, from aircraft maintenance crews, from administrative units,

<sup>50</sup> OKW/WFSt Sitreps. 1-7 Jul; Harrison, *Cross-Channel Attack*, pp. 464-67; see Lt. David Garth, *The Battle for Normandy*, pp. 10-12, MS, OCMH; *Lagebeurteilung OB WEST to OKW/WFSt*, 1600, 3 Jul, *OB WEST KTB* and *Anlage 452*.

<sup>51</sup> *Der Westen* (Schramm), 48-49; OKW/WFSt Sitrep, 30 Jun; *OB WEST KTB*, 2, 5, 7, and 8 Jul, and *Anlage 423*; Pogue, *Supreme Command*, p. 180.

and a certain number of recruits and foreigners.<sup>52</sup>

To replace combat losses in the various units in the face of competition between Himmler and Goering for the limited German manpower was no easy task. In late 1942 the Germans had set up training, or reserve, divisions designed to furnish replacements for units in combat. Originally these divisions had had an occupation role, which had not impaired their training function, but later they became garrison troops, and when occupying coastal sectors they were upgraded to field divisions. Thus, instead of existing for the purpose of supplying replacements to the combat forces, they were themselves eventually in need of replacements.<sup>53</sup>

Although diversity of units, competition between services, and a defective replacement system prevented the Germans from maintaining combat formations at authorized strengths, the difficulties of transportation comprised the most important reason for manpower shortages on the front. By the end of June, when the railroads were badly damaged by Allied air attack and all the Seine River bridges except those at Paris had

been destroyed, barges moving on the Seine from Paris to Elbeuf and an eighty-mile overland route for trucks and horse-drawn wagons from Elbeuf to Caen formed perhaps the most dependable line of communications. All highways and other supply routes were overcrowded and in constant danger of Allied air attacks during daylight hours. Units traveling to reinforce the front had to move in several echelons, reload several times en route, and march a good part of the way on foot, mostly at night.

Transportation difficulties also created supply and equipment shortages. At the beginning of July, the deficit in fuel amounted to over 200,000 gallons per day. Of daily requirements figured at 1,000 tons of ammunition, 1,000 tons of fuel, and 250 tons of rations, only about 400 tons of all classes of supply could be brought to the front.<sup>54</sup> That the quartermaster general of the west had to borrow fifteen machine guns from the military governor of France in order to fill a request from the Cherbourg garrison illustrated into what straits German supply had fallen.<sup>55</sup> For lack of dependable and long-distance railroad routes, armored divisions wore out valuable equipment on the highways before getting to the combat area. The major highways to Normandy were littered with wrecked vehicles. Movement was possible only during darkness, and that at a snail's pace.<sup>56</sup>

Conspicuous by their absence from the battlefield were the planes of the *Third Air Fleet*. German ground troops grimly joked that Allied aircraft

<sup>52</sup> Behind the front the Organization Todt, a paramilitary formation of German and foreign laborers, both hired and impressed, was an auxiliary construction force. Formed in 1938 to build the West Wall, Todt helped Army engineers repair roads, build bridges, and construct fortifications. Order of Battle Annex 9, Semi-Mil Servs, XV Corps G-2 Per Rpt 25, 28 Aug.

<sup>53</sup> WD TM-E 30-451, *Handbook on German Military Forces* (Washington, 15 March 1945); SHAEF Intel Notes of 24 Aug 44, German Replacements to the Normandy Battle Area, FUSA G-2 Jnl and File; Order of Battle Annex 2, 17 Luftwaffen Feld Division (Air Force Field Div), 18 Aug, XV Corps G-2 Per Rpt 16, 19 Aug.

<sup>54</sup> Hodgson, R-24.

<sup>55</sup> OB WEST OQu WEST KTB, 21 and 24 Jun.

<sup>56</sup> OB WEST, *A Study in Command*, I, 91ff.

were painted silver, while German planes in contrast were colorless and invisible: "In the West they say the planes are in the East, in the East they say they're in the West, and at home they say they're at the front." Of an authorized 500 aircraft in the west, the Germans had about 300 planes, of which only about 90 bombers and 70 fighters could get off the ground at any one time because of shortages of spare parts and fuel. This small number could not challenge the Allied air supremacy.<sup>57</sup>

By July there was, however, a new weapon in operation that gave the Germans hope of redressing their discouraging situation. Air missiles called the V-1 (originally after *Versuchmuster*, meaning experimental model, later *Vergeltungswaffe*, translated vengeance weapon) and launched for the most part from the Pas-de-Calais area had on 13 June begun to fall on England in a campaign that was to last eighty days. Admittedly a terror agent directed at the civilian population, the V-1's were intended as a reprisal for Allied air attacks on German cities. The campaign reached its greatest intensity during the seven-day period ending 8 July, when a total of 820 missiles were counted approaching the English coast. The Germans soon began to launch some V-1's from medium bombers. Though they were not to appear until early September, the Allies learned in July that V-2 weapons, supersonic rockets deadlier than the V-1's, were almost ready for operational use.

Allied bombers had since 1943 been attacking V-weapon installations, particularly those diagnosed as ground

launching sites. Despite air force protests that the bombardment (Operation CROSSBOW) diverted planes from their primary offensive mission, and despite the fact that air bombardment of the sites was an inadequate defense against the reality of the V-1 attack and the potentiality of the V-2, General Eisenhower on 29 June ordered the air attacks to "continue to receive top priority." Without effective defenses to combat either the V-1 or the V-2, the Allies could only hope that ground forces on the Continent would soon overrun the launching sites. Though the guided missile attacks caused widespread death and destruction in England, they had no effect on Allied tactical or logistical operations. Yet in late June and early July the V-1's and the V-2's were a "threat of the first magnitude" to the Allied command, for "no member of the Allied forces, at any level, knew exactly what the new German weapons might accomplish."<sup>58</sup>

Though many difficulties and disadvantages faced the German ground soldiers, morale was generally high. Dis-

<sup>57</sup> Royce L. Thompson, *Military Impact of the German V-weapons, 1943-1945*, MS, OCMH; Lt Col Melvin C. Helpers, *The Employment of V-weapons by the Germans during World War II*, OCMH Monograph; Magna Bauer, *The German Withdrawal From the Ardennes (May 1955)*, R-59; Wesley Frank Craven and James Lea Cate, eds., *The Army Air Forces in World War II*, Vol. III, *Europe: Argument to V-E Day* (Chicago: The University of Chicago Press, 1951) (hereafter cited as *AAF III*), p. XXV, Chs. IV and XV; Eisenhower, *Crusade in Europe*, pp. 259-60; SGS SHAEF File 381, CROSSBOW. Allied concern over German jet-propelled planes, another new development, prompted warnings to the ground forces that any jet aircraft that were shot down were to be guarded so that AEAF personnel could make a technical examination of the remains. VII Corps Ops Memo 36, 13 Jul.

<sup>57</sup> MS #C-017 (Speidel).

ipline continued to be an effective cohesive power. Leadership, though often not entirely unified at the higher echelons of command, was excellent at the combat levels. Career and reserve officers and men, as well as conscripted personnel, professed to be uninterested in politics and concerned only with performing their duty. SS officers and non-commissioned leaders were hard-bitten Nazis who were literal minded about their pledge to fight until they died.

Paratroopers were excellent soldiers. Only the volunteer foreign troops serving with German units were undependable under fire, and they constituted but a small part of the entire German force.

Despite complaints of impotence due to Allied air superiority, despite a shortage of replacements and supplies, despite the harassing operations of the FFI that slowed the movement of reserves to the battlefield, the Germans in the west had yet to be beaten.

## CHAPTER III

### The Situation

#### *American*

General Bradley was responsible for the conduct of American operations in Normandy. His mild and modest manner might easily have led those who did not know him to underestimate his qualities as a commander in combat. But General Eisenhower judged that he had "brains, a fine capacity for leadership, and a thorough understanding of the requirements of modern battle."<sup>1</sup> General Bradley was to prove more than equal to his tasks.

During most of his early career General Bradley had alternated between assignments at the U.S. Military Academy and the Infantry School, both as student and instructor. After Pearl Harbor, as a division commander, he directed in turn the training activities of two divisions. He received his first overseas assignment as deputy commander of General Patton's II Corps, in North Africa. When General Patton relinquished the corps command in order to form the Seventh U.S. Army headquarters for the invasion of Sicily, General Bradley became the corps commander for the remainder of the North African

campaign and the operations in Sicily. In the fall of 1943 he was called to England to command both the U.S. 1st Army Group and U.S. First Army. As commander of the 1st Army Group, General Bradley supervised the planning of the U.S. ground units that were to participate in OVERLORD.<sup>2</sup> As commander of the First Army, he directed the American elements in the invasion assault.<sup>3</sup> Under the control of General Montgomery, temporarily the Allied ground commander, General Bradley, as the senior American field commander on the Continent, enjoyed a far wider latitude of action than would normally have been granted him had he been directly under an American commander.<sup>4</sup>

The land force that General Bradley commanded at the beginning of July consisted of four corps headquarters and thirteen divisions—nine infantry, two armored, and two airborne. Not all the units had been tested and proved by

<sup>1</sup> 12th AGP AAR, I, 5.

<sup>2</sup> The First Army staff assisting General Bradley on the Continent was formed about a nucleus of veterans. One tenth of the headquarters officers, over 30 individuals, had had combat experience in the Mediterranean. Maj. Gen. William B. Kean, the chief of staff, Col. Joseph J. O'Hare, the G-1, Col. Benjamin A. Dickson, the G-2, Col. Truman C. Thorson, the G-3, and Col. Robert W. Wilson, the G-4, belonged in this category. First U.S. Army, *Report of Operations*, I 14-15.

<sup>3</sup> Bradley, *Soldier's Story*, pp. 209-10, 350.

<sup>1</sup> Ltr, Gen Eisenhower to General George C. Marshall, 24 Aug 43, as quoted in parchment MS by Forrest C. Pogue, *The Supreme Command*, Ch. I, p. 73, OCMH Files.

combat, but except for one armored and two infantry divisions all had had some battle experience during June. Scheduled to lose both airborne divisions in the near future, General Bradley momentarily expected the arrival of two additional infantry divisions and soon thereafter several armored divisions.

Even while the focus of the U.S. First Army effort had been directed north toward Cherbourg in June, General Bradley had tried to get an American attack to the south started. General Montgomery had urged him not to wait until Cherbourg fell before extending his operations southward toward la Haye-du-Puits and Coutances. General Eisenhower had reminded Bradley to "rush the preparations for the attack to the south with all possible speed," before the Germans could rally and seal off the First Army in the Cotentin.<sup>5</sup>

The attack had depended on the arrival in France of the VIII Corps, a headquarters assigned to the U.S. Third Army but attached temporarily to the First. Operational on the Continent on 15 June, the VIII Corps had assumed control of those forces holding a line across the base of the Cotentin Peninsula and had protected the rear area of the troops driving toward Cherbourg. General Bradley had instructed the VIII Corps commander to attack to the south on 22 June, but the Channel storm of 19-21 June disrupted logistical operations and caused a temporary shortage of artillery ammunition. Because the Cherbourg operation and the attack to the south could not be supported simul-

taneously, the VIII Corps offensive was postponed.<sup>6</sup>

On the day that Cherbourg fell—26 June—General Bradley had again directed the advance south toward Coutances, this time to begin on or about 1 July, VIII Corps moving out first and the other corps following on army order. Once more the operation had to be delayed because tactical regrouping and logistical arrangements were not completed in time.<sup>7</sup>

On the last day of June General Bradley received from General Montgomery the formal instructions that were to govern his action in July. Montgomery took his cue from the NEPTUNE plan, which had projected a wheeling movement, as opposed to a north-south axis of advance in the OVERLORD plan, and directed the U.S. First Army to pivot on its left in the Caumont area. Wheeling south and east in a wide turn, the First Army was to find itself, upon completion of the maneuver, facing east along a north-south line from Caumont, through Vire and Mortain, to Fougères, its right flank near the entrance into Brittany. At this point in the operations General Patton's Third U.S. Army was to become operational and move south and west to seize Brittany, while the First Army, in conjunction with the British and Canadian forces on the left, was to advance east toward the Seine and Paris. Desiring "drive and energy," General Montgomery wanted General

<sup>5</sup> 21 AGp Dir, M-504, 19 Jun, Pogue Files; Ltr, Eisenhower to Bradley, 25 Jun, FUSA G-3 Jnl File.

<sup>6</sup> First U.S. Army, *Report of Operations*, I, 82; VIII Corps AAR, Jul; Montgomery to Eisenhower, M-30, 25 Jun, SGS SHAEF File 381, Opn OVERLORD, I (a); Bradley, *A Soldier's Story*, pp. 303-04.

<sup>7</sup> FUSA FO 1, 26 Jun; First U.S. Army, *Report of Operations* I, 82.

Bradley, once started, to continue without pause.<sup>8</sup>

General Bradley's revised and final order disclosed his intention to accomplish his mission in several phases. He named the Coutances-Caumont line as the immediate objective of the First Army attack that was to start on 3 July. The main effort was to be made in the Cotentin.<sup>9</sup>

Not all of the U.S. troops were in the Cotentin. In the left portion of the army sector, east of the Vire River, Americans lightly held a salient in *bocage* terrain, where the small hills, while not particularly favorable for offensive action, were not discouragingly adverse. Since the middle of June, while the major portion of the American strength had been operating against Cherbourg on the army right, the troops near St. Lô and Caumont had remained inactive because General Bradley had been unwilling to divert to them resources needed for the drive on Cherbourg; and because offensive activity on the left could have extended the salient and perhaps opened a gap between the American and the British forces.<sup>10</sup> It was this latter factor that prompted General Bradley to initiate the attack to the south across the damp spongy ground of the Carentan plain. (*See Map I.*)

At the conclusion of the attack on the right, and with his troops holding the Coutances-St. Lô-Caumont line, General Bradley would have his entire army on firm dry ground, terrain suitable for offense by mechanized forces. At that

time, as the elements on both sides of the Vire River would be on similar terrain, he would be able to deliver an attack with equal effectiveness from either his left or his right. Then he would be ready to begin another operation in further compliance with General Montgomery's directive to wheel on his left to the Fougères-Mortain-Vire-Caumont line. But first Bradley had to move the forces on his right across the waterlogged area west of Carentan.

This swampy terrain was a natural position for defense. There, in 1940, the French had established a line and had endeavored to prevent the Germans from capturing Cherbourg. In 1944 the Germans were holding approximately the same positions they had occupied four years earlier, but this time they were on the defensive.<sup>11</sup> The area was excellent for defense because of the *prairies marécageuses*. Large marshes sometimes below sea level, the *prairies* appear to be ancient arms of the sea, land partially reclaimed from the ocean. Open spaces that seem absolutely flat, they are breaks in the hedgerow country providing long vistas across desolate bogs.

There are five of these large swamps on the Carentan plain. Four are located along rivers draining into the Carentan bay—the Merderet, the Douve, the Taute, and the Vire. The river beds are so close to sea level that the water does not flow at a discernible rate of speed but rather oozes toward the ocean; often the streams appear stagnant. The fifth marsh or bog, called

<sup>8</sup> 21 AGP Dir, M-505, 30 Jun, Pogue Files.

<sup>9</sup> FUSA FO 1 (rev), 1 Jul.

<sup>10</sup> See Harrison, *Cross-Channel Attack*, pp. 374, 376-77; First U.S. Army Report of Operations, I, 72-73.

<sup>11</sup> See Jacques Mordal, "La Defense de Cherbourg," *La Revue Maritime*, New Series No. 76 (August, 1952), 963-80.

the Prairies Marécageuses de Gorges, is about twelve square miles in size and lies southwest of Carentan. These major swamps and many smaller marshes comprise nearly half the area of the Carentan plain.

From the height of an adjacent hill the *prairies* seem at first glance to be pastureland, though the grass is neither bright nor lush. A base of brown dims the lustre of the vegetation like a blight. This is peat, semicarbonized vegetable tissue formed by partial decomposition in water, plant masses varying in consistency from turf to slime. Impassable in the winter when rain and snow turn them into shallow ponds, the *prairies* in the summer are forage ground for cattle. Because the land is treacherously moist and soft, crossing the bogs on foot is hazardous, passage by vehicle impossible. In addition to numerous streams and springs that keep the earth soggy, mudholes and stagnant pools, as well as a network of canals and ditches, some intended for drainage and others originally primitive routes of transportation, close the marshland to wheeled traffic except over tarred causeways that link settlements together.

Adjacent to the marshes and comprising the other half of the Carentan plain is hedgerowed lowland suitable for farming. Barely above the level of the swamps, the lowland frequently appears to consist of "islands" or "peninsulas," wholly or partially surrounded by marshland.

Because swamps comprise so much of the region, the arable land is divided into tiny fragments of ownership. Since the fields are smaller than those in the *bocage*, the hedgerows are more numer-

ous. The excessive moisture of the lowlands stimulates growth to the point where the luxuriant vegetation is almost tropical in richness, and the hedgerows are higher and thicker. The ground is hardly less soft than the neighboring marshes because of a high water table.

Since the swamps are impassable to a modern mechanized army, the hedge-rowed lowland of the Carentan plain, even though of precarious consistency, had to sustain General Bradley's projected operations in July. But the consented him with strictly limited avenues of advance. To proceed through the Cotentin, U.S. troops had to advance within well-defined corridors blocked by huge hedgerows.

The Germans had emphasized this natural condition by flooding much of the moist swampland and transforming it into lakes. They had constructed concrete dams to keep fresh-water streams from reaching the sea and had reversed the automatic locks of the dams originally constructed to hold back the sea at high tide. In the summer of 1944 the marshland was covered with water.<sup>12</sup> The insular or peninsular character of

<sup>12</sup> VIII Corps AAR, Jul; (British) Inter-Service Information Series (I.S.I.S.), *Report on France*, Vol. II, Normandy, West of the Seine, Pt. III (C), "Waterways" (Inter-Serv Topographical Dept Jan, 43); Abbé Paul Levert, "Le Front Allemand est Brisé," in René Herval, ed., *Bataille de Normandie*, 2 vols. (Paris: Editions de "Notre Temps," 1947), Vol. I, p. 159n; Le Capitaine de Vaisseau Delpuech, *Le Mur de l'Atlantique*, 10 vols., Vol. III *La Côte de la Manche, de la Seine au Mont St. Michel* (Bordeaux, 1952) (MS in possession of the Hist Sec, Ministry of the Navy, Republic of France), p. 95; Robert Bethignies, *Le Sacrifice de Dunkerque* (1940) (Lille, 1947), pp. 225-26. I am indebted to Médecin en Chef Hervé Cras of the Historical Section, Ministry of the Navy, Republic of France, for the two latter references.

the corridors of advance was thereby intensified.

The U.S. forces by the beginning of July had secured jump-off positions on the dry land of the Carentan plain. These were obvious to the Germans, who held superior ground on the *bocage* hills that ring the Cotentin marshes. With excellent observation of American movements, the Germans were able to mass their fires with such accuracy that American commanders warned drivers against halting their vehicles at cross-roads, near bridges, or in towns; drivers were to proceed briskly through intersections, to take cover during a forced halt, and, if not able to camouflage their vehicles when stopped, to get clear without delay.<sup>13</sup> Even far behind the front, care had to be exercised. When a tank destroyer unit disregarded the warnings of military police and crossed a bridge on a main route three miles behind the front line, a division provost marshal renounced his "responsibility" for the safety of that unit.<sup>14</sup>

Three corridors of advance lead through the Carentan plain, each marked by a road. One goes along the west coast of the Cotentin from la Haye-du-Puits to Coutances. Another runs from Carentan southwest to Périers. The third goes south from Carentan to St. Lô. General Bradley decided to make his main effort along the coastal road, for that corridor is the widest and the ground the most firm. Along this axis, but in reverse, the Germans had broken through the French defenses in 1940 and gained Cherbourg.

<sup>13</sup> 1st AGP Observers Gp Ltr, 1 Jul, VIII Corps G-3 Jnl File.

<sup>14</sup> 82d Abn Div G-3 Jnl, 0130, 2 Jul.

The VIII Corps, which comprised the army right flank on the west coast of the Cotentin, was to advance through la Haye-du-Puits to Coutances, a longer distance than that down the corridors leading south from Carentan to Périers and St. Lô. By having VIII Corps begin its advance first, General Bradley expected all the army elements to reach the objective line at the same time. The VII Corps, alerted to advance along the Carentan-Périers axis, and that part of the XIX Corps west of the Vire River, positioned for an advance from Carentan toward St. Lô, were to go into action in turn, from right (west) to left (east).

Although General Bradley thus exposed himself to criticism for piecemeal commitment, he had no other logical choice.<sup>15</sup> The VII Corps headquarters, which had hurried south from Cherbourg to take a sector at Carentan, needed time for orientation. The XIX Corps required troops that were in the process of arriving from the landing beaches. But with higher headquarters impatiently demanding that the offensive to the south get underway at once, and with the attack having been postponed twice before, General Bradley felt that he could not delay. Furthermore, waiting until all units could attack simultaneously would give the enemy more opportunity to prepare his defenses, an opportunity the Germans had certainly exploited during the previous two-week period of inactivity.

Although most of the Americans facing the hedgerow and marshy terrain of the Cotentin were aware of the difficulties to come, the opposite had been

<sup>15</sup> See VIII Corps AAR, Jul.

true before the invasion. American officers for the most part had known little of the hedgerow country. Few had seen the hedgerows, and air photos gave no real appreciation of what they were like. If most American commanders had not been able to visualize hedgerow fighting, most of the soldiers had not even been able to imagine a hedgerow. Not until the U.S. troops entered the hedgerows in June had they begun to have an idea of how effectively the terrain could be used for defense.<sup>16</sup>

The hedgerow fighting in June had been so difficult that many units made special studies of the problem. Most concluded that the principles of tactics taught at The Infantry School at Fort Benning, Georgia, applied in this terrain as elsewhere. The task was to pin the enemy down with a base of fire and maneuver an element along a covered approach to assault from the flank. In Normandy the lateral hedgerows marked not only the successive lines of advance and the positions for a base of fire but also the enemy defensive positions; hedges parallel to the line of advance could be made to serve as covered approach routes.

As this technique developed in June, a refinement emerged. The tank-infantry team operating toward a short objective and with a simple plan proved to be effective. The objective was always the same, the next hedgerow. The plan was to provide for simultaneous advance of armor and infantry and their mutual support. As it usually worked out, a tank platoon supporting an infantry company fired through the lateral hedge that marked the line of departure and

sprayed the flank hedgerows and the far side of the field to be taken with covering fire. The infantry advanced along the flank hedges to the next lateral row and cleared the enemy out at close range. With the field thus secured, one section of tanks moved forward, while the other remained temporarily at the rear to eliminate enemy troops that might suddenly appear from a concealed point or from an adjacent field. White phosphorus shells from 4.2-inch chemical mortars and artillery could be brought to bear on stubborn enemy groups.<sup>17</sup>

Advancing from one field to the next and clearing out individual hedgerows was a costly and slow procedure. It exhausted the troops and brought a high rate of casualties, but the slow plodding technique seemed necessary since "blitz action by tanks" was usually unsuccessful. A rapid armored advance generally resulted in only bypassing enemy groups that held up the infantry that was following.<sup>18</sup>

Several drawbacks complicated the simple type of small unit attack developed in June. One difficulty was moving armor through the hedgerows. The openings that already existed in the enclosures for wagons and cattle were well covered by German antitank gunners, and the appearance of an American tank prompted an immediate reaction. Although it was possible for a tank to climb the smaller hedgerow banks, the tank's most vulnerable part, the relatively lightly armored underbelly, was

<sup>17</sup> XIX Corps, The Tk-Inf Team, 24 Jun, VIII Corps G-3 Jnl File, Jul; 507th Parachute Inf AAR, Jun and Jul.

<sup>18</sup> FUSA Armd Sec Memo 1, Lessons from Combat in Normandy, 19 Jun, 30th Div G-3 Jnl File.

<sup>16</sup> Answers by Gens Smith and Bull, 14-15 Sep 45.