



UNDERSTANDING  
SACRIFICE

## Activity: Horror in the Hedgerows: Technology, Tactics, and Teamwork



### Guiding question:

How did the Allies adapt to the unforeseen difficulties of hedgerow combat?

#### DEVELOPED BY JOE BOYLE

**Grade Level(s):** 9-12

**Subject(s):** Social Studies

**Cemetery Connection:** Normandy American Cemetery

**Fallen Hero Connection:** Sergeant Paul Boyle  
Private Henry Saaga



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## Overview

Using primary and secondary sources, students will identify the major challenges of fighting in the hedgerow country of Normandy. Students will independently develop tactics to attack the hedgerows, then learn how American forces finally adapted to combat in the hedgerows.


## Historical Context

While Allied forces were reasonably well prepared for the invasion of the beaches at Normandy, they were thoroughly unprepared for the terrain that lay just beyond the beach. The battles in the hedgerows demonstrate the importance of good planning, great leadership, and adaptation and ingenuity by average soldiers. The hedgerows of the Normandy countryside were a unique challenge for the invading Allied forces after D-Day. Men like Sergeant Paul Theophane Boyle, who died in this intense fighting, rest in Normandy American Cemetery.

## Objectives

At the conclusion of this lesson, students will be able to

- Describe how hedgerows lent themselves to defense; and
- Explain what changes in leadership, tactics, and technology allowed the Allies to break free of the hedgerows.



*“I chose to write a lesson regarding combat in the hedgerows, because it is a fantastic example of both the best and worst aspects of U.S. military operations in World War II. In the negative, it shows America’s lack of full preparation for the war; but in the positive, it shows the ingenuity of American servicemen in adapting to, and overcoming, obstacles.”*

—Joe Boyle

Boyle teaches at Morrison R. Waite High School in Toledo, Ohio.

## Standards Connections

### Connections to Common Core

**CCSS.ELA-Literacy.RH.9-10.3** Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them.

**CCSS.ELA-Literacy.RH.9-10.1** Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.

### Connections to C3 Framework

**D2.His.1.9-12** Evaluate how historic events and developments were shaped by unique circumstance of time and place as well as broader historical contexts.

## Documents Used ★ indicates an ABMC source

### Primary Sources

Excerpt of a Memorandum from Lawton Butler to Infantry Commanders, "Tanks in Support of Infantry" June 20, 1944

National Archives and Records Administration

Map, *Periers*, 1943

National Archives and Records Administration (RG 77, M-865)

Photograph, *Aerial View of Omaha Beach on D Plus 1*, June 7, 1944

U.S. Army

<http://www.ibiblio.org/hyperwar/USA/USA-E-XChannel/USA-E-XChannel-8.html>

Photograph, *Tank with Hedgerow Cutter and Sandbags*

U.S. Army Center of Military History

[http://www.history.army.mil/books/wwii/beachhd\\_btleftfrnt/OD14.htm](http://www.history.army.mil/books/wwii/beachhd_btleftfrnt/OD14.htm)

### Secondary Sources

Stanley Blumenson, *Breakout and Pursuit*

U.S. Army Office of the Chief of Military History

Michael D. Doubler, *Busting the Bocage: American Combined Arms Operations in France 6 June - 31 July 1944*

U.S. Army Command and General Staff College

[www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA211817](http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA211817)

*Normandy Campaign Interactive* ★

American Battle Monuments Commission

[http://www.abmc.gov/sites/default/files/interactive/interactive\\_files/normandy/index.html](http://www.abmc.gov/sites/default/files/interactive/interactive_files/normandy/index.html)

Photographs of hedgerows, 2015

Joseph Boyle

Video, Site of Sergeant Paul Boyle's Death ★

American Battle Monuments Commission

<http://abmceducation.org/understandingsacrifice/activity/horror-hedgerows-technology-tactics-and-teamwork?resources=1>

## Materials

- *Periers* Map
- Photographs of hedgerows, 2015
- Hedgerows Materials Packet
- Video at Site of Sergeant Paul Boyle's Death

## Lesson Preparation

- Make one copy of the Hedgerows Materials Packet for each student.
- Cue the projector to share the *Periers* Map, photographs of hedgerows, and video at the site of Sergeant Paul Boyle's Death.
- Test all online resources before class.

## Procedure

### Activity One (45 minutes)

- Project the *Periers* Map on the board. Ask students to identify features on the map. Give them time. List the towns, the rivers, and other identifiable features.
  - Identify the towns of Carentan and Periers on the map. Explain that the U.S. Army's job was

to get from Carentan to Periers in a few days of battle. *Is there anything on the map that would appear to make that mission difficult? Why, or why not?*

- Project the set of ground-level photographs of hedgerows connecting them. Ask the students: *Do these look like easy places to attack, why, or why not? Would it be easier to defend or attack a position like this? Why?*
- Show students the video at the site of Sgt. Paul Boyle’s death.
- Distribute materials packets to students. Explain that the hedgerows presented a problem for American forces that was not easily solved.
- Ask students to read “What Were the Hedgerows?” and “Where Were the Hedgerows?” sections of the packet. Ask the following discussion questions:
  - *What are some specific characteristics of the hedgerows that would have made them tough to attack?*
  - *What are specific ways the German defenders used the terrain to their advantage?*
  - *Why was it important for the American forces to push through this country?*
- Have students read “Why Were American Forces Unprepared to Take Them?” Ask the students:
  - *Who do you think was responsible for the unpreparedness of American troops?*
  - *Is it possible in war to be prepared for ANY eventuality?*
  - *Teacher Tip:* This discussion provides a natural breaking point if a teacher chooses to split the lesson over two days.

## Activity Two (45 minutes)

- Review key principles from prior section of the lesson. Have students describe the nature of the hedgerows, where the hedgerows were, why they were difficult to attack, why they were easy to defend, and describe how American forces attacked them at first.
- Preview second part of the lesson: *Now, we are going to look at how we might have attacked if we were in command – and then we are going to learn how American forces adapted to the hedgerow combat over time.*
- Ask students to open their packets to the page titled “You Are the Officer.” Explain that each student (or team, depending on the needs of class) will work with the same map to determine the best way to achieve the objective with minimum loss of life.
  - Direct the students to show where and how they would use their RS (rifle squads), HW (heavy weapons), and M4 (tanks) to attack a sample hedgerow.

- Circulate through the room to see how students choose to attack. Gently remind the students that tanks are not invincible – that they are susceptible to attack from German *panzerfausts*, which were similar to bazookas.
- Have student volunteers share their best attack plan. If technology permits, project the student map on a whiteboard or smartboard, and have the students draw how their attack would work. Invite the rest of the class to critique the plans drawn up by each group.
- Explain that, given the technology and tactics at the beginning of the war, there were few plans that actually would have worked.
- Have the students begin to read the section “How Did We Break Through?” and have them answer the questions for each subsection. Discuss:
  - *Was one of the three factors (technology, tactics, leadership) more important than the others? Explain.*
  - *Do you think the lessons of adapting to the hedgerows have a parallel in our lives? Are there situations into which we walk unprepared? How should we adapt to them?*

## Assessment

- Written responses each day will give the teacher an idea of what each individual student has learned from the day’s activities.

## Methods for Extension

- Activity One could be assigned for homework with a more advanced group of students, allowing more time for Activity Two.
- Students with more interest in combat in the hedgerows could read the entirety of Doubler’s *Busting the Bocage* and Blumenson’s *Breakout and Pursuit*.
- The American Battle Monuments Commission maintains U.S. military cemeteries overseas. These cemeteries are permanent memorials to the fallen, but it is important that students know the stories of those who rest here. To learn more about the stories of some of the men and women who made the ultimate sacrifice, visit [www.abmceducation.org/understandingsacrifice/abmc-sites](http://www.abmceducation.org/understandingsacrifice/abmc-sites).

## Adaptations

- Teachers can adapt the project to younger students or English language learners by having students research some of the trickier vocabulary as an introduction to the project. Younger student could also focus more on the geographic aspects of the assignment instead of the military science aspects.



## What are the Hedgerows?

The land behind the beaches that American forces assaulted on June 6, 1944 is today beautiful, rolling countryside. But the very features that make it beautiful are the features that made it terrible territory for an invader to attack. The countryside was defined by multiple winding rivers, narrow farm lanes, and the tree-and-shrub framed fields of the hedgerow country, known locally at the “Norman Bocage.”



Aerial View of Omaha Beach on D Plus 1, June 7, 1944  
[U.S. Army](#)

Hedgerows are small, man-made earthen walls that surround a field. The hedgerows in Normandy date back to Roman times, when they were used to enclose pastures and mark property lines. Each hedge is generally between two and six feet wide at its base, and anywhere from three to fifteen feet high. Atop this earthen base is a tangle of trees, shrubs, and prickly brambles – essentially creating all-natural fences around the small fields, generally no bigger than an American football field.

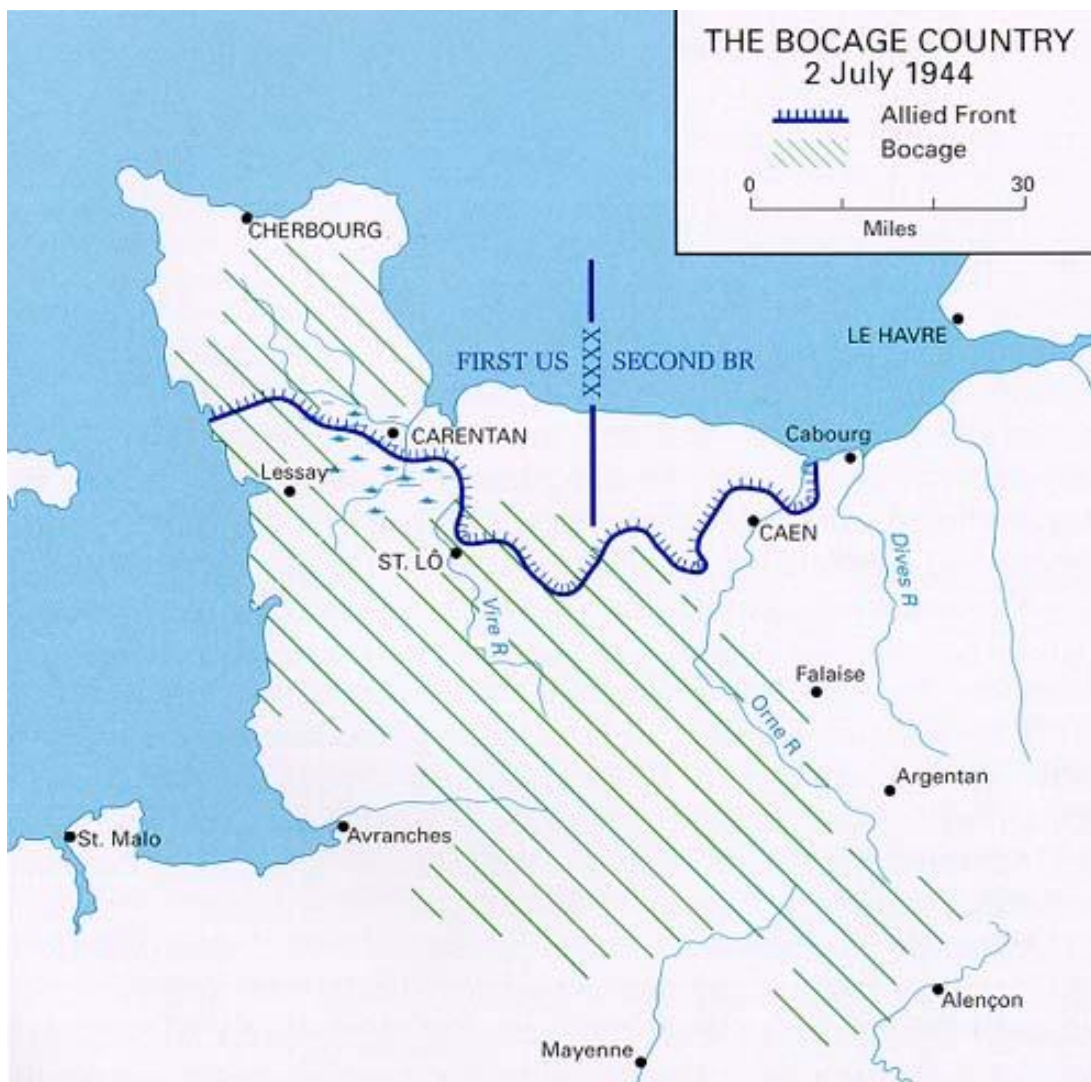
The hedgerow country grew organically over the centuries, well before train or automobile transportation. The fields were generally irregular in shape, and narrow wagon lanes between the hedges twisted and turned throughout the countryside.

As historian Stephen Ambrose wrote, “No terrain in the world was better suited for defensive action” in World War II than the hedgerows.<sup>1</sup> German defenders could station large cannon and field guns in the curve of a narrow, sunken farm lane and destroy any American tanks coming up the path. German infantry could dig into the sides of the hedges and use the foliage and natural camouflage of their positions. German snipers could climb high in the trees to have full view of each small battlefield.

It was important territory for the Allies to take, as they pushed from the beaches south to the important transportation hub of St. Lô.

<sup>1</sup> Stephen Ambrose, *The Men of War*, (New York: Simon and Schuster, 1998), <http://books.simonandschuster.com/Stephen-EAmbrose-The-Men-of-War-E-book-Box-Set/Stephen-E-Ambrose/9781476756929>.

## Where were the Hedgerows?



*The Bocage Country*  
[U.S. Army](#)

The hedgerow country of France does not have formal borders, but it basically stretches inland, encompassing most of the Cotentin Peninsula, and then moving inland toward Falaise, Argentan, and Alençon.

The area was seen as critical to Allied plans in order to take the city of St. Lô, which was among the most important communications and transportation hubs in the region – and the key to breaking out toward Paris.



## Why were American forces unprepared to take the hedgerows?

Many scholars have debated why, exactly, American forces were so unprepared for combat in the hedgerows. Top American armed forces officials knew about the hedgerows, and in fact, had aerial photographs of the region clearly showing how the area was broken up into little fields surrounded by trees and brush.

“Despite Allied planners’ awareness of the nature of the Bocage,” wrote Army historian Michael Doubler. “American commanders had done little to prepare their units for fighting among the hedgerows.”<sup>2</sup>

Even the maps soldiers carried into combat did not reveal the treacherous nature of the landscape. Army mapmakers, under pressure to get maps finished to distribute to the combat forces, were allowed to leave out “much fine detail, such as hedgerows,” read the Army’s official history of World War II.

While some senior officers had a vague idea the hedgerows existed, few passed this information on to the junior officers who would lead the regiments, battalions, and companies tasked with fighting through this land. Neither junior nor senior officers had done much, if anything, to teach their troops how to attack a hedgerow. Many of the tactics would be learned on the fly – and would be learned at great cost to American forces.

Fighting in the hedgerows, Ambrose described, was like fighting in a maze. Platoons got separated from one another in the initial moves of an assault. The 83rd Infantry Division was committed to combat for the first time in late June 1944. Patrols of men got lost in the hedgerows; sometimes a company would attack forward, only to find out that they had gone more than 1,000 yards further than their comrades, and were in danger of being completely cut off.

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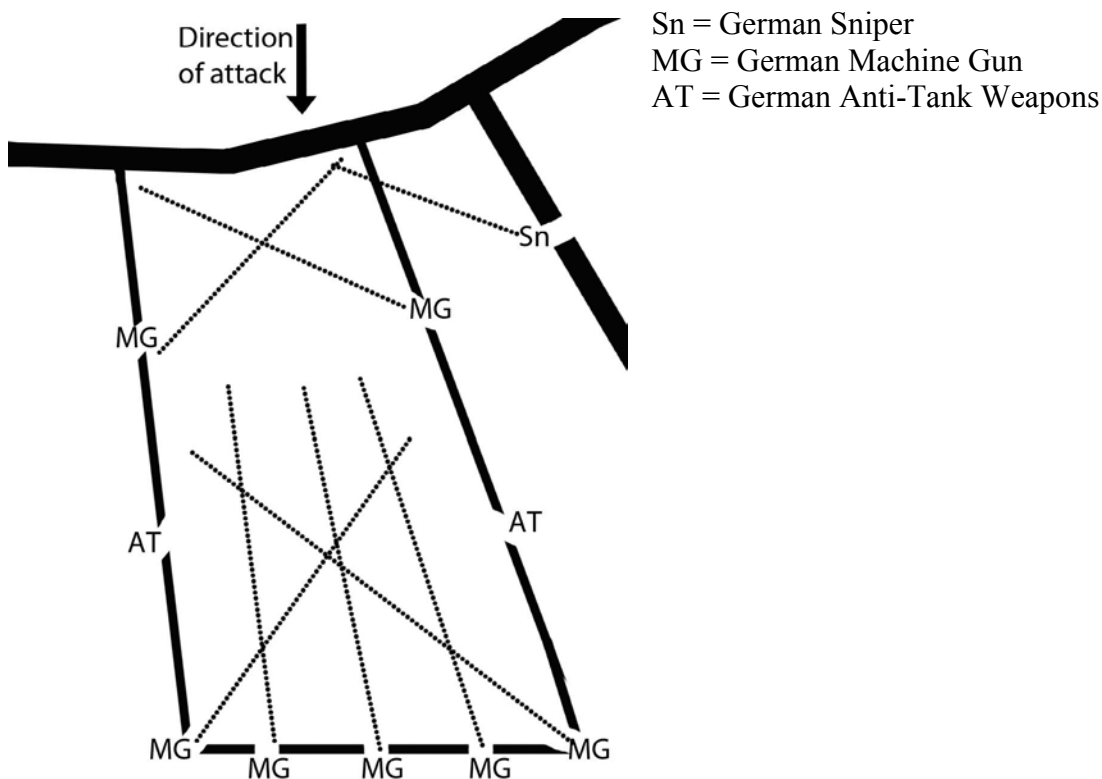
<sup>2</sup> Michael D. Doubler, *Busting the Bocage: American Combined Arms Operations in France 6 June - 31 July 1944*, U.S. Army Command and General Staff College, [www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA211817](http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA211817).

## How did American troops try to take them at first?

German soldiers had spent time and effort digging into their defensive positions, and turned every field into a “well prepared kill zone,” as Doubler wrote.<sup>3</sup> American troops at first charged directly into each field, hoping their numbers and bravado would force the Germans back.

Such assaults were suicide missions, leading thousands of men to their deaths. If foot soldiers crossed over and into the open field, they would be cut down by machine gun fire. If tanks attempted to go up-and-over the hedgerows, they would expose their lightly-armored undersides to deadly German anti-tank weapons. The 331st Infantry Regiment, C Company lost 90 percent of its original men just three weeks into the hedgerow combat after repeated frontal assaults into the fields.

German machine gun positions in the corners of the hedgerows gave them ‘interlocking fields of fire,’ meaning that each gun’s range overlapped another gun’s range. Mortars behind the hedgerow were pre-aimed at locations in the middle. In short, all the Germans had to do was wait for head-on attacks. The diagram below shows how this worked.



3 Doubler, *Busting the Bocage*. [www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA211817](http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA211817).

## You Are the Officer

The problem American forces at every level had to solve seemed deceptively simple: How do we take the hedgerows more effectively, and with less loss of life?

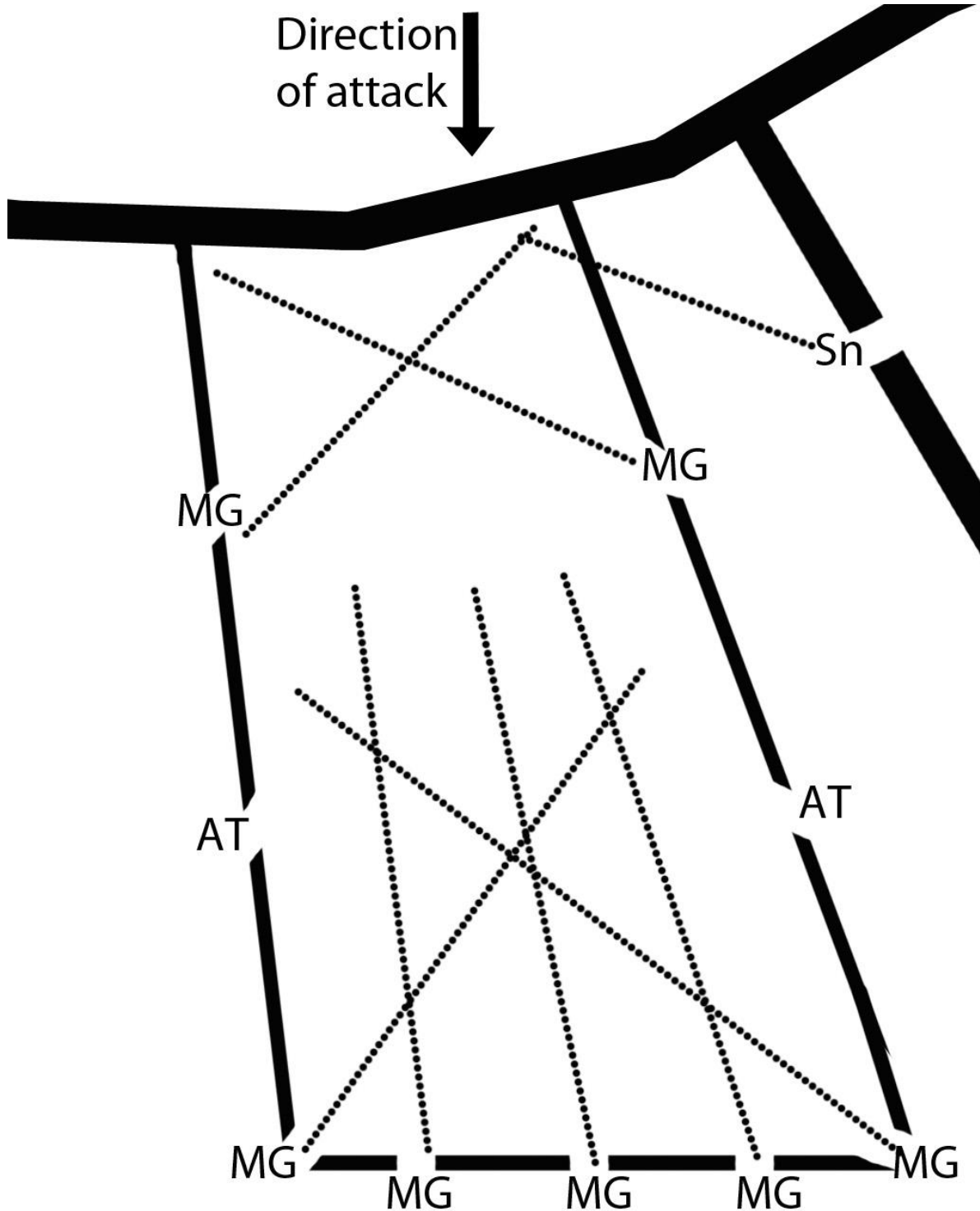
It is July 26, 1944. You are the commanding officer of C Company of the 331st Infantry Regiment. Your company of about 200 men has been assigned to take the hedgerow-surrounded field marked 'X' on the map. Regimental commanders have given you two tanks to assist in your assault.

Using the attached map, draw the following symbols to show where you will use these elements in your assault:

<b>RS</b>	Rifle squad; 12 men armed with M-1 rifles. You have THREE of these at your disposal.
<b>HW</b>	Heavy weapons squad; 12 men in a team with three M-1917 heavy machine guns. You have ONE of these at your disposal.
<b>M4</b>	M-4 Sherman Tank; You have TWO of these at your disposal.

As a class, share your best plans for breaking through the bocage!

# Student Map<sup>4</sup>



<sup>4</sup> Adapted from Doubler, *Busting the Bocage*. [www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA211817](http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA211817).

## How did American troops break through?

Breakthroughs in leadership, technology, and tactics allowed American forces to actually break out of the hedgerows.

### Leadership

Read the following selections and answer the questions. "...

Two root concepts occur again and again throughout the discussions on the roles of the combat arms and the conduct of military operations. The first was the critical importance of dynamic, competent leadership. Commanding troops in combat was a complex task that required leaders to possess 'will power, self-confidence, initiative, and disregard of self,' as well as superior knowledge about technical and tactical matters. In the introduction to [Field Manual] 100-5, Army Chief of Staff George C. Marshall stressed that it was a function of competent leadership to combine doctrinal concepts with battlefield experience to produce plans that would ensure success in battle."<sup>5</sup>

*The table below illustrates the changes in command in the First Battalion of the 331st Infantry Regiment from its formation through the end of the fighting in the hedgerows. This unit's time in hedgerow combat began on July 1, 1944, and concluded on July 26, 1944.*

331st Regiment Commander	1st Battalion Commander
COL Ercil Porter (8/15/1942 - 11/1943 <sup>^</sup> ) COL Martin Barndollar (11/1943 - 7/4/1944 <sup>*</sup> ) LTCOL William Long (7/4/1944 <sup>o</sup> ) COL John Whitcomb (7/4/1944 - 7/6/1944 <sup>o</sup> ) LTCOL George Bowen (7/7/1944 - 7/9/1944 <sup>‡</sup> ) COL James D. Bender (7/9/1944 - 7/11/1944 <sup>*</sup> ) COL Robert York (7/12/1944 - 4/1946)	LTCOL William Long (8/15/1942 - 7/1943 <sup>^</sup> ) LTCOL Thomas F. McNeil (7/1943 - 11/1943 <sup>^</sup> ) LTCOL Henry Neilson (11/1943 - 7/5/1944 <sup>o</sup> ) CAPT Floyd Souder (7/5/1944 - 7/5/1944 <sup>^</sup> ) 1LT Harry Gravelyn (7/5/1944 - 7/5/1944 <sup>^</sup> ) LTCOL Harold Ericksen (7/6/1944 - 7/26/1944 <sup>*</sup> )

\* denotes killed in action

<sup>^</sup> denotes transfer

<sup>o</sup> denotes temporary command

<sup>o</sup> denotes wounded in action

<sup>‡</sup> denotes relieved from command

5 Doubler, *Busting the Bocage*. [www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA211817](http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA211817).





## Technology

Neither working together nor apart could infantry and armor find a way to break quickly through a hedgerow to use speed to overwhelm the German defenses. At first, they tried to use explosives to rip through the hedges – but it took too much explosive material. Then they tried to use pipes fixed to the front of the tanks to push holes into the hedges to insert smaller amounts of explosives.

Then Sergeant “Bud” Culin took a look at the tanks. Culin, a New Jersey native, heard a young soldier joke that the Americans should put saw teeth on the front of the tanks. Culin took the idea and ran with it, welding sharpened metal teeth on the front of the M-4 Sherman tanks.

Using steel from German beach defenses, more than 500 tanks were equipped with “Culin Rhino” attachments. With these modifications, tanks were able to quickly break through individual hedgerows, and allow the infantry to work alongside them in the clearings.



*Tank with Hedgerow Cutter and Sandbags*  
[U.S. Army Center for Military History](https://www.army.mil/history/)

# Tactics

When combat began in the hedgerows, infantry units essentially worked independently of tank units. The truth of the matter, though, was that armor and infantry needed each other.

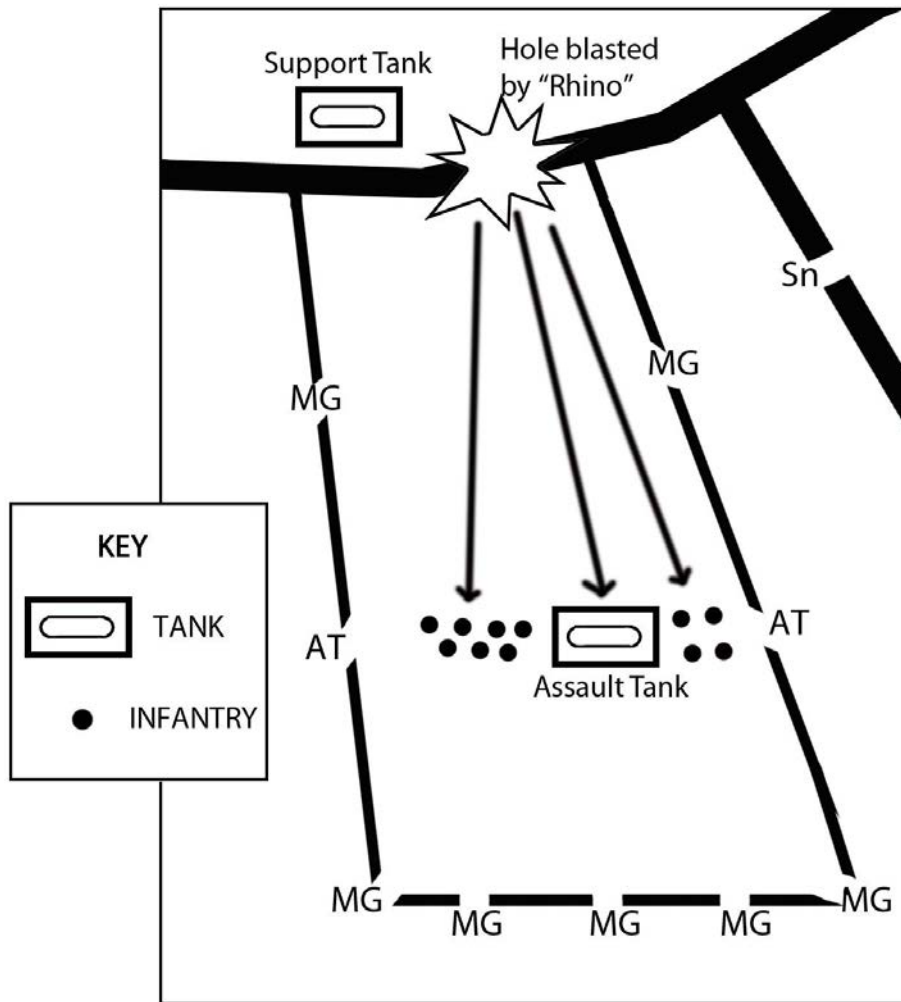
American M-4 Sherman tanks needed to be on the move to avoid being stationary targets for German anti-tank weapons. To be on the move in the hedgerow country meant needing the infantrymen to attack the German positions quickly. The infantrymen needed the firepower the Shermans could bring in order to advance.

Yet despite the symbiotic nature of armor and infantry, they often failed to communicate well with each other in the early days of the hedgerow battles. Infantry were hesitant to work with the tanks, because they couldn't communicate to the men inside. Tanks were hesitant to work with infantry, because the infantry often waited too long after a tank entered a hedge-surrounded field, leaving the tank vulnerable to German anti-tank weapons.

This began to change not from the top down, but with solutions created by individual soldiers. Some began running a telephone line to the rear of the tank, so soldiers could call into the tank commander with information about where the next target was. Some commanders teamed up the same infantry companies with the same tank crews, so the groups of soldiers could create a level of trust and communication that would serve each better.

Introduction of the rhino tanks allowed the tanks to break through the hedges more quickly, and allow the infantry to move in immediately with them. Soon, each division created new combined-arms tactics that worked for them, and American forces began to advance a little more quickly through the hedgerow country in mid-July.

The diagram on the following page shows one way the 83rd Infantry Division used tanks to work with infantry. The hedgerow depicted in the diagram is similar to one attacked by the First Battalion, 331st Regiment of the 83rd Infantry on 26 July 1944. It was an ultimately unsuccessful attack, as a tank began firing before infantry were in position, which drew heavy German fire on the attacking American troops.



1. What were the dangers to infantrymen and tankers in this attack?

2. How could the infantry have helped the tankers? How could the tankers help the infantry?

Note: Image adapted from Doubler, *Busting the Bocage*. [www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA211817](http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA211817).







## Inside a field surrounded by hedgerows, Normandy, France

Photograph by Joseph Boyle, 2015





## Lane bordered by two hedgerows, Normandy, France

Photograph by Joseph Boyle, 2015





## Looking into a hedgerow, Normandy, France

Photograph by Joseph Boyle, 2015





## Approximate location where Sergeant Paul T. Boyle died

Photograph by Joseph Boyle, 2015

