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RATES OF ADVANCE IN INFANTRY DIVISION  
ATTACKS IN THE NORMANDY-NORTHERN  
FRANCE AND SIEGFRIED LINE CAMPAIGNS

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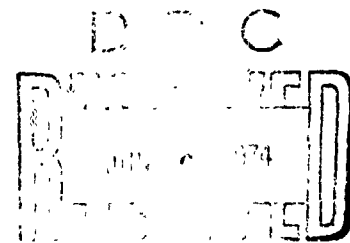
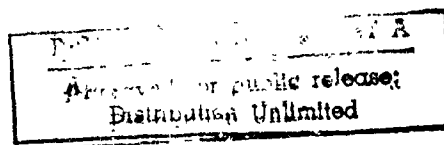
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PAPER P-990

RATES OF ADVANCE IN  
INFANTRY DIVISION ATTACKS  
IN THE NORMANDY-NORTHERN FRANCE  
AND SIEGFRIED LINE CAMPAIGNS

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## PREFACE

The research presented in this paper is in the area of historical combat statistics for possible use as input to simulation models.

Historical research was focused on two areas: casualties and advances. The former subject is covered in a separate paper (P-989). The present paper deals with advances in two campaigns: Normandy-Northern France and the Siegfried Line.

The purpose of this paper is not to attempt to establish precise relationships among the factors of rate of advance, casualties, resistance, and terrain. There is usually insufficient numerical data for that even on a one-sided basis. Rather, it is hoped that some general relationships--some proportions--will emerge that will be of use to model-builders.

Data are presented for attacks in which an advance was gained. Then a rough estimate is made of the percent of all attacks in which an advance was registered.

## RATES OF ADVANCE IN INFANTRY DIVISION ATTACKS IN THE NORMANDY-NORTHERN FRANCE AND SIEGFRIED LINE CAMPAIGNS

### A. NATURE OF THE SAMPLE

A representative list of 90 Allied infantry division attacks has been prepared in order to illustrate the character of advances achieved and the casualties incurred. Eighty-seven of the attacks were by U.S. units, and three were by Canadian divisions (included for comparative purposes). The 50 actions in Normandy-Northern France occurred between mid June and mid August 1944, with the exception of two attacks during the capture of Cherbourg in early September. The 40 U.S. actions during the Siegfried Line campaign occurred in the Fall of 1944. Five battles of the Ardennes campaign, coming in the final U.S. counterattack phase, are also included in this group, since the terrain was comparable to that of the Fall battles.

The place names are generally descriptive, in the sense that they designate the main town or terrain feature near the scene of battle. In some cases, it will be noted, several actions occurred over several days near the same place name. A few operations are designated by the code name--"Cobra" (the U.S. breakthrough in Normandy), "Goodwood-Atlantic," and "Totalize" (British-Canadian operations) in the same campaign.

It should be stressed that many attacks fail to gain any ground, and these 90 advances were chosen because they did show an advance. Later, the approximate percent of all attacks in which advances occurred is determined.

Only bald statistics are presented, since, for purposes of statistical analysis and simulation, descriptive text on each

battle really contributes little beyond some additional understanding of factors that cannot be quantified.

## B. DATA SOURCES

The figures on strengths, casualties, and advances are drawn from primary historical records or official histories (the bibliography indicates the sources of the data). Only in the case of the three Canadian actions are the unit-strength figures estimated, in view of the nonavailability of Canadian source records.<sup>1</sup> Terrain descriptors and degree-of-resistance estimates are taken directly from official and unit histories or after-action reports. In the case of those actions that cover several days, the unit strength given is the average of the recorded strength on the several days. Since, generally, these strengths varied comparatively little, the averages are probably close to the actual figures.

## C. THE NATURE OF THE TWO CAMPAIGNS

In order that the reader not familiar with the two campaigns might be better able to put into proper context the comments and statistics that follow, a brief description of each campaign seems in order.

### 1. Normandy-Northern France

The Normandy-Northern France campaign occupied the first 90 days after the Allied invasion of 6 June 1944. Once ashore and the bridgehead was secured, the Allies drove to expand it, moving very slowly and with severe losses. On the Allied left, the British and Canadians inched toward the open country and east of Caen. Here the Germans amassed most of their panzer strength to cover the good tank

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<sup>1</sup>Curiously, the "A" or G1 Sitrep of Main HQ, 21st Army Group, which is in U.S. Archives, gives daily strengths for U.S. divisions, but not for British or Canadian formations.



country. The Americans in the West fought a grim six weeks through the bocage or hedgerow country--ideal for defense. Advances were measured in yards, from one hedgerow to another. (Nineteen of the actions examined fall in the period 6 June-24 July.)

Despite the capture of Cherbourg by American forces on 27 June and of half of Caen by the British and Canadians on 8 July, the Allies seemed to have been stalemated. By the third week in July, the bridgehead remained a fraction of what it was supposed to have been by that date. Allied losses were severe--and not only in the infantry. A major British breakthrough effort on 18 July led to the loss in two days of 36 percent of all British tanks on the Continent.

Nevertheless, the attrition told more on the Germans, whose forces were being bled away without even being able to launch a major counterattack. The German command realized that if their front broke they would have no recourse but to retreat right back to the German frontier area, where natural defenses were more available.

The second half of the campaign (the campaign divides neatly into six-week halves) began with the American attack and breakthrough at St. Lo on 25 July. The American forces burst out of the bridgehead into Brittany, while Montgomery's British and Canadians attacked south from Caen. With Patton's swift success in Brittany, it was decided by 2 August to launch the bulk of his Third Army out across France toward Paris. At the same time, the largest attack the Germans were ever able to mount in the campaign, against Mortain on 7 August, was soon smothered, after only a slight initial advance.

The Americans driving up from the South and the British driving down from the North put the German Seventh Army into a sausage-shaped salient barely 15 miles wide at its base at Falaise-Argentan. Retreating out of the pocket, the German Seventh Army was smashed to pieces, yet the shoulders of the opening to the East were held open against the British long enough for the remnants of the German forces to escape.

Paris was liberated on 24 August, and Allied columns streamed across France almost to the Belgian border. In the meantime, the Allied landing in southern France launched the U.S. Seventh Army northward. (The other 31 Normandy-Northern France actions fall in this second six-week period.)

The battle in Normandy-Northern France was over by 3 September. The Germans had lost almost half a million men. The campaign was one of almost continuous Allied offensive operations against German defensive positions. These latter could be categorized as hastily fortified positions, or prepared positions, until the time of the breakthrough. In addition, siege operations were conducted against the several Brittany port strongholds.

## 2. The Siegfried Line

The grinding battles fought by the First and Ninth U.S. Armies between 11 September and 16 December were only part of the overall Allied operations of the period. However, all the advances achieved were small compared to the spectacular advances of August and early September, after the breakout from Normandy. While the British and Canadians painfully cleared the lower Netherlands, the two northern American armies tried to battle through the fortifications of the Westwall and the natural barriers of Germany's borders. The nature of the fighting on this front can best be realized by the fact that from 11 September, when U.S. patrols first crossed the German frontier, until 16 December (96 days later) U.S. forces managed to advance only 22 miles into Germany. There were no grand pursuits. U.S. forces had to fight for almost every yard of advance. There were no armored breakthroughs, and tanks were used in an infantry support role only. A heavy price in men and materiel had to be paid for every yard gained.

After the rush across France, the allies had approached the Siegfried Line in spread pursuit formation. They had reached the limit of their logistical capabilities, the troops were tired, and

there was a two-week lull in the pursuit. Once at the frontier, they met a revitalized German army, which used the artificial and natural barriers to great advantage. It became difficult to advance very far, until the logistical and tactical strength had been built up and the enemy worn down by attrition.

Attrition was the hallmark of the Siegfried Line campaign. Battle was on a regimental level at best. The isolation imposed by the terrain (the forest was much like, but even worse than, the hedgerows of Normandy) meant that control was very difficult and that small units carried the action forward individually rather than as part of a larger-scale scheme of maneuver. The real enemy, the American forces agreed, was the forest. It created not merely a combat meat-grinder but, combined with the weather, led to staggering noncombat losses as well.

Fighting desperately and effectively on ground ideally suited to the defense, the Germans fought very active defensive operations. During this period, American forces were on the defensive a large part of the time, fighting off incessant German counterattacks. Thus, the number of U.S. attack days was considerably smaller than for an equivalent period in Normandy-Northern France.

#### D. TERRAIN

Terrain has been categorized as (1) open, (2) mixed, and (3) close or difficult. The word mixed thus includes the two commonly used descriptors, moderately open and moderately close, the distinction between which is really rather fine and essentially judgmental.

##### 1. Normandy

The Normandy terrain was of a diversified nature, but only within certain bounds. On the Allied left (the British-Canadian flank) was the Caen-Falaise plain, gently rolling open country of cultivated fields and pastures, dry and firm ground suitable for large-scale

armored operations and airfield construction. Facing the Allied center between the Orne and the Vire Rivers were the northern fringes of a sprawling mass of broken ground, small hills, low ridges, and narrow valleys, gradually rising in height toward the South. West of the Vire River, in the Carentan area, was a marshy depression crisscrossed by slow streams and drainage ditches. On the Allied far right, between the marsh land and the coast, a cluster of hills dominated the countryside. There were no mountains, and hills and ridges were gently sloped and rounded.

With the exception of the Caen-Falaise plain, the area had a compartmentalized character, which restricted maneuver and favored defense. These natural limitations were compounded by the hedgerows, with their often associated sunken lanes and dense vegetation. This bocage country was extremely difficult terrain, in which U.S. troops were compelled to operate until in late July they began pushing into more open country. While some of the British front included bocage country, the Canadian actions listed herein all took place in the more open Caen plain.

Some of these operations included river crossings, which have been included, along with bocage and swamps, as difficult country (category 3, above).

Similarly, the two U.S. actions against Brest are categorized as in difficult terrain (the first being in the approach to the city; the second, city street fighting--certainly a most difficult environment). It should also be noted that many of these 50 actions involved fighting in towns and villages, but it is usually unstated in the record just how much of an action actually took place within built-up areas. Consequently, no separate category has been established for this combat environment.

## 2. Westwall

In the Westwall campaign, September-December 1944, the First U.S. Army operated in two very different terrain regions. The left

wing of the Army faced the Aachen Gap, guarded by the city of Aachen itself, which afforded entry to the open plain that led all the way to the Rhine. The country here was farmland mixed with small woods. Opposite the right wing of the Army was the Eifel, an area of heavily forested highlands, which could seriously canalize an advance and in which communications were virtually nonexistent. Some of the hardest fighting of the campaign was to occur in a fan-shaped sector reaching out from Aachen toward the Roer River.

The heartland of the Eifel itself, compartmentalized by numerous streams and blanketed with dense, wet pine-forest, was where the first American patrols had crossed into Germany. Yet, for all the difficulties presented by the terrain, it had been used to military advantage by the Germans in 1914 and 1940. They would use it again in their Ardennes counteroffensive of December 1944.

Once through the forest, U.S. forces entered the open country of the Roer Plain, where armor once more was able to operate as more than infantry support.

In addition to the formidable natural barriers, the U.S. forces had to smash their way through the Westwall. This, the Siegfried Line, was built on the first natural barrier east of the German border. Its purpose was to increase the defensive potential of the terrain along the border. Where the natural barrier was weakest, the concentration of fortifications was strongest. The Line consisted of a large number of reinforced concrete pillboxes, sited to be mutually supporting and armed with automatic weapons and light antitank guns. These were well camouflaged by several years of natural growth and disuse. There were, in addition, open earthworks for heavier artillery and extensive hasty field fortifications for the infantry. The Line constituted a continuous barrier all along the front of the First U.S. Army.

In actual fighting, however, the fortifications probably caused U.S. forces less difficulty than did the forest itself.

The Fall of 1944 was to produce weather of near record severity. Rainfall far exceeded the average, while frost and snow were earlier and more frequent than usual. Not merely did the weather seriously hamper infantry and armored operations, especially in the attack, but it also degraded markedly the effectiveness of Allied air support of the ground forces.

Close terrain was primarily forest with deep narrow ravines and small streams. Mixed terrain was a combination of forest and farmland. Open terrain was essentially the plain area beyond the forest belt along the German border. Needless to add, characterization of terrain is generally gross. The breakdown of 40 Siegfried Line battles according to terrain type is shown thus:

|                |                |            |
|----------------|----------------|------------|
| close (forest) | - 14 battles - | 35 percent |
| mixed          | - 16 battles - | 40 percent |
| open           | - 10 battles - | 25 percent |

A major action at this time was the capture of Aachen, and many of the October battles covered were part of the movement to encircle the city. However, no actions within the city itself were included. Many of the other battles involved fighting in settled areas; and, as in the Normandy case, it is generally not possible to distinguish what proportion of an action occurred in a town versus the proportion that occurred on the open ground around it.

#### E. DEGREE OF RESISTANCE

In the absence of German strength figures comparable to those obtainable for U.S. units, degree of resistance rather than force ratio or enemy posture has been used as the descriptor for the enemy. The terms comprehend primarily three factors: the unknown force ratios, the nature of the enemy position, and the spirit of the enemy troops. The degree of enemy entrenchment--fortified position, prepared position, etc.--is not the best descriptor, since it is the fighting spirit of resistance maintained by the troops, as much as the strength of their position, that ultimately determines degree

of resistance. Clearly, of course, there is an interrelationship between the two, each factor reinforcing the other. However, the Second World War offers many examples of second-quality troops being forced out of very strong positions at small cost to the attacker.

In the Normandy cases, three simple categories of resistance are used: heavy, moderate, and light. For the Siegfried Line cases, five categories are used because the records employed a further breakdown of descriptor: heavy, moderate to heavy, moderate, light to moderate, and light. A more fine-grained and precise general categorization is really not supportable by the historical record, since the degree of resistance may well vary in different areas of a division attack front, as well as at different times during the period of the attack.

An important anomaly becomes obvious in this categorization. The descriptor terms are those generally used in reference to the actions in the official histories. Yet in several cases the term used does not appear to accord with the casualties suffered. For example, in Normandy the 9th Division at Briouze-Fromental Road took 137 casualties against what historians referred to as light opposition, while the 2nd Division at Brest suffered only 73 casualties against resistance designated as heavy. On 28 November, the 104th Division reported "heavy resistance," but casualties numbered only 79. On 21 November the 8th Division, against "heavy resistance," suffered only 38 casualties; and on 27 November, only 46 casualties. The spread between losses to claimed "heavy resistance" in the Siegfried Line actions runs from a low of 38 to a high of 972.

It is obvious that no standard measure exists for the relationship between degree of resistance and casualties--anymore than for advances (as mentioned above). Clearly, reaction to what was termed "heavy resistance" varied. A unit could stop after fairly light casualties, or it could continue to drive ahead and take even greater losses. Both would have encountered heavy resistance, but with

different consequences. Circumstances are so varied as to defy any neat distinctions.

What is suggested is that there may be no direct correlation between the number of casualties and the degree of resistance the troops felt they were encountering. The historical record is full of cases of attacks being stalled by very small opposing forces, because the attackers thought they were meeting heavy resistance rather than because that heavy resistance really existed.

#### F. DURATION OF COMBAT

Most of the actions represent single-day actions, although several battles are really composed of a number of single-day actions. For simplicity's sake, a single day has been established as the base unit, despite the fact that in nearly every case the action lasted less than a full day and, for most actions, even less than the daylight period of the day. The purpose of the study is not to determine rates of advance on an hourly basis, but rather to determine the scale of the forward movement achieved in a good-sized sample.

#### G. LEVEL OF RESOLUTION

While the actions listed all involved a single division, it should be understood that the entire division was not always involved. Attacks involving two of three regiments were most common, while single regiment attacks are also included, since they did represent an effort mounted by a division in which the division artillery and tank units invariably participated. There are also included cases where all three regiments or brigades attacked simultaneously, but divisional attacks using only a portion of the division were the norm. Battle really was a contest between regimental-sized units with their supporting elements.



#### H. ANALYSIS OF ADVANCE DATA--NORMANDY-NORTHERN FRANCE

In terms of terrain, 19 of the attacks were made over close terrain, 5 over open terrain, and 28 over mixed terrain. Of these 50 attacks, 22 were against opposition categorized as "heavy," 14 against "moderate," and 14 against "light." A simple time distinction can be made. Those battles before 31 July (Actions #1-26 in Table 1) were heavy going, generally, against well-defended positions. After the breakthrough of Operation Cobra, from 31 July on, German opposition generally began to diminish to the point where, by mid August, the situation began to assume the proportions of a pursuit.

Actions 49 and 50 (street fighting in Brest) really belong in the first category by virtue of the severity of the fighting involved, although they occurred during the pursuit phase elsewhere in France.

The advances ranged from a high of 10,600 yards to a minimum of 300 yards. The median number was 2400 yards. The advances on a daily basis can be grouped as shown in Table 2.

Daily advances in terms of degree of resistance encountered are shown in Table 3.

There is a marked variation in advance gained within each category, running, for heavy opposition, from 300 to 8000; for moderate, from 1000 to 9700; and for light, from 2000 to 6000. The highest individual gains were registered against heavy and moderate opposition.

The following averages can be derived from the data:

- Average daily advance for 22 successful attacks against generally heavy resistance (excluding 20 and 21, since they gained no ground; but including 49 and 50) is 1882 yards.
- Average daily advance for 14 attacks against generally moderate resistance is 3023 yards.
- Average daily advance for 13 attacks against generally light resistance is 3984 yards.
- Average daily advance for 50 attacks (excluding 20 and 21) is 2794 yards.

Table 1. INFANTRY DIVISION ATTACKS (NORMANDY-NORTHERN FRANCE)

| Action Number | Unit              | Location               | 1944 Date | Duration (Days) | Terrain Code | Degree of Resistance | Allied Strength | Battle Casualties | Actual or Daily Average of Advance |
|---------------|-------------------|------------------------|-----------|-----------------|--------------|----------------------|-----------------|-------------------|------------------------------------|
| 1.            | 2nd Inf.          | Forest de Cerisy       | 13-14 Jun | 2               | Close        | Heavy                | 14,340          | 473               | 1750 yds                           |
| 2.            | 9th Inf.          | Pont l'Abbe            | 14-15 Jun | 2               | Close        | Moderate             | 13,110          | 242               | 1250 yds                           |
| 3.            | 29th Inf.         | Amy                    | 16 Jun    | 1               | Close        | Moderate             | 13,600          | 171               | 3000 yds                           |
| 4.            | 2nd Inf.          | St. Germain d'Elle     | 16 Jun    | 1               | Close        | Heavy                | 13,858          | 558               | 300 yds                            |
| 5.            | 79th Inf.         | Montgardon Ridge       | 2-7 Jul   | 5               | Close        | Heavy                | 12,978          | 2070              | 2100 yds                           |
| 6.            | 82nd Abn.         | Poterie Ridge          | 3-5 Jul   | 3               | Close        | Heavy                | 6,591           | 624*              | 2450 yds                           |
| 7.            | 90th Inf.         | Monte Caestre          | 3-7 Jul   | 5               | Close        | Heavy                | 13,325          | 2000              | 1400 yds                           |
| 8.            | 3rd Canadian Inf. | Caen                   | 8-9 Jul   | 2               | Open         | Heavy                | 17,500**        | 1194              | 4100 yds                           |
| 9.            | 30th Inf.         | Vire River bridgehead  | 7 Jul     | 1               | Close        | Heavy                | 13,872          | 281               | 2500 yds                           |
| 10.           | 83rd Inf.         | Periers Sector         | 4-5 Jul   | 2               | Close        | Heavy                | 12,528          | 1855              | 900 yds                            |
| 11.           | 83rd Inf.         | Carentan-Periers Road  | 9 Jul     | 1               | Close        | Heavy                | 12,769          | 122               | 700 yds                            |
| 12.           | 30th Inf.         | Pont Herbert           | 10 Jul    | 1               | Close        | Heavy                | 13,185          | 202               | 3000 yds                           |
| 13.           | 2nd Inf.          | Hill 192               | 11 Jul    | 1               | Close        | Heavy                | 14,824          | 407               | 1350 yds                           |
| 14.           | 29th Inf.         | Martinville Ridge      | 11 Jul    | 1               | Close        | Heavy                | 14,400          | 444               | 2400 yds                           |
| 15.           | 8th Inf.          | Hill 92                | 12 Jul    | 1               | Close        | Light                | 13,130          | 344               | 2000 yds                           |
| 16.           | 79th Inf.         | Hill 92                | 12 Jul    | 1               | Close        | Light                | 11,641          | 115               | 2500 yds                           |
| 17.           | 9th Inf.          | Les Champs des Losques | 13 Jul    | 1               | Close        | Moderate             | 14,411          | 228               | 1500 yds                           |
| 18.           | 4th Inf.          | Toward Periers         | 5-15 Jul  | 10              | Close        | Heavy                | 14,788          | 2300              | 350 yds                            |
| 19.           | 2nd Canadian Inf. | "Goodwood-Atlantic"    | 18-21 Jul | 4               | Open         | Heavy                | 17,500**        | 1149              | 1450 yds                           |
| 20.           | 4th Inf.          | "Cobra"                | 26 Jul    | 1               | Mixed        | Heavy                | 14,933          | 115               | 8000 yds                           |
| 21.           | 5th Inf.          | "Cobra"                | 26 Jul    | 1               | Mixed        | Moderate             | 14,215          | 188               | 2000 yds                           |
| 22.           | 2nd Inf.          | "Cobra"                | 26 Jul    | 1               | Mixed        | Heavy                | 14,468          | 477               | 3000 yds                           |
| 23.           | 8th Inf.          | "Cobra"                | 26 Jul    | 1               | Mixed        | Heavy                | 13,505          | 407               | 750 yds                            |
| 24.           | 2nd Inf.          | "Cobra"                | 27 Jul    | 1               | Mixed        | Moderate             | 14,393          | 463               | 1000 yds                           |
| 25.           | 5th Inf.          | "Cobra"                | 28 Jul    | 1               | Mixed        | Heavy                | 14,146          | 216               | 1000 yds                           |
| 26.           | 2nd Inf.          | "Cobra"                | 30 Jul    | 1               | Mixed        | Heavy                | 14,078          | 185               | 1300 yds                           |
| 27.           | 2nd Inf.          | "Cobra"                | 31 Jul    | 1               | Open         | Light                | 14,193          | 100               | 4200 yds                           |
| 28.           | 2nd Inf.          | Vire                   | 1 Aug     | 1               | Mixed        | Moderate             | 14,059          | 255               | 4000 yds                           |
| 29.           | 35th Inf.         | Torigny-sur-Vire       | 1 Aug     | 1               | Mixed        | Light                | 13,157          | 130               | 5500 yds                           |
| 30.           | 1st Inf.          | Bresey                 | 2 Aug     | 1               | Mixed        | Light                | 14,720          | 50                | 4000 yds                           |
| 31.           | 2nd Inf.          | Tessy-sur-Vire         | 2 Aug     | 1               | Mixed        | Light                | 13,969          | 112               | 6000 yds                           |
| 32.           | 35th Inf.         | Tessy-sur-Vire         | 2 Aug     | 1               | Mixed        | Light                | 12,945          | 214               | 6000 yds                           |
| 33.           | 9th Inf.          | Bresey                 | 3 Aug     | 1               | Mixed        | Light                | 13,717          | 148               | 3000 yds                           |
| 34.           | 2nd Inf.          | Tessy-sur-Vire         | 3 Aug     | 1               | Mixed        | Moderate             | 14,295          | 94                | 3000 yds                           |
| 35.           | 35th Inf.         | Tessy-sur-Vire         | 3 Aug     | 1               | Mixed        | Light                | 12,690          | 174               | 3000 yds                           |
| 36.           | 2nd Inf.          | Vire                   | 4 Aug     | 1               | Mixed        | Moderate             | 14,589          | 65                | 4400 yds                           |
| 37.           | 2nd Inf.          | Vire                   | 5 Aug     | 1               | Mixed        | Light                | 14,341          | 202               | 2000 yds                           |
| 38.           | 2nd Inf.          | Tinchebray             | 9 Aug     | 1               | Mixed        | Light                | 14,621          | 18                | 3800 yds                           |
| 39.           | 29th Inf.         | Vire                   | 6 Aug     | 2               | Mixed        | Moderate             | 12,850          | 407               | 2000 yds                           |
| 40.           | 2nd Canadian Inf. | "Totalize"             | 7 Aug     | 1               | Mixed        | Moderate             | 17,000**        | 323               | 9700 yds                           |
| 41.           | 28th Inf.         | Mortain                | 11 Aug    | 1               | Mixed        | Moderate             | 12,320          | 274               | 1000 yds                           |
| 42.           | 29th Inf.         | Mortain                | 11 Aug    | 1               | Mixed        | Moderate             | 12,997          | 184               | 1000 yds                           |
| 43.           | 29th Inf.         | Tinchebray             | 13 Aug    | 1               | Mixed        | Moderate             | 13,311          | 77                | 3400 yds                           |
| 44.           | 29th Inf.         | La Freane Paret        | 14 Aug    | 1               | Mixed        | Moderate             | 13,454          | 44                | 4000 yds                           |
| 45.           | 2nd Inf.          | Tinchebray             | 14 Aug    | 1               | Mixed        | Heavy                | 13,574          | 309               | 1100 yds                           |
| 46.           | 29th Inf.         | Tinchebray             | 15 Aug    | 1               | Mixed        | Light                | 13,651          | 20                | 6000 yds                           |
| 47.           | 2nd Inf.          | Tinchebray             | 15 Aug    | 1               | Mixed        | Light                | 13,779          | 70                | 5000 yds                           |
| 48.           | 9th Inf.          | Briouze Frontal Road   | 17 Aug    | 1               | Mixed        | Light                | 13,362          | 137               | 3000 yds                           |
| 49.           | 2nd Inf.          | Brest                  | 1 Sep     | 1               | Close        | Heavy                | 13,511          | 74                | 800 yds                            |
| 50.           | 2nd Inf.          | Brest                  | 9 Sep     | 1               | Close        | Heavy                | 14,468          | 92                | 800 yds                            |

\*4-5 July only.

\*\*Estimated.

Table 2. DAILY ADVANCES IN 50 SUCCESSFUL ALLIED DIVISION ATTACKS

| Yards per day | Number of Cases |   |   |   |   |   |   |   |   |   |    |    |    | Percentage |
|---------------|-----------------|---|---|---|---|---|---|---|---|---|----|----|----|------------|
|               | 0               | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |            |
| 300-999       | .               | . | . | . | . | . | . | . | . | . | .  | .  | .  | 14         |
| 1000-1999     | .               | . | . | . | . | . | . | . | . | . | .  | .  | .  | 24         |
| 2000-2999     | .               | . | . | . | . | . | . | . | . | . | .  | .  | .  | 18         |
| 3000-3999     | .               | . | . | . | . | . | . | . | . | . | .  | .  | .  | 18         |
| 4000-4999     | .               | . | . | . | . | . | . | . | . | . | .  | .  | .  | 12         |
| 5000-5999     | .               | . | . | . | . | . | . | . | . | . | .  | .  | .  | 4          |
| 6000-6999     | .               | . | . | . | . | . | . | . | . | . | .  | .  | .  | 6          |
| 7000-11,000   | .               | . | . | . | . | . | . | . | . | . | .  | .  | .  | 4          |

Table 3. DAILY ADVANCES BY RESISTANCE CATEGORY  
[In yards]

| Heavy (22 actions)                       | Moderate (14 actions) | Light (14 actions) |
|------------------------------------------|-----------------------|--------------------|
| 1750*                                    | 1250*                 | 2000               |
| 300                                      | 3000                  | 2500               |
| 2100*                                    | 1500                  | 4200               |
| 2450*                                    | 2000                  | 5500               |
| 1400*                                    | 1000                  | 4000               |
| 4100*                                    | 4000                  | 6000               |
| 2500                                     | 3000                  | 6000               |
| 900*                                     | 4400                  | 3000               |
| 700                                      | 2000*                 | 3000               |
| 3000                                     | 9700*                 | 2000               |
| 1350                                     | 1000                  | 3800               |
| 2400                                     | 1000                  | 6000               |
| 350                                      | 3500                  | 5000               |
| 1450*                                    | 4000                  | 3000               |
| 8000                                     |                       |                    |
| 3000                                     |                       |                    |
| 750                                      |                       |                    |
| 1000                                     |                       |                    |
| 1300                                     |                       |                    |
| 1100                                     |                       |                    |
| 800 - Brest                              |                       |                    |
| 800 - Brest                              |                       |                    |
| *Represents a multi-day advance average. |                       |                    |

The relationship of terrain type to degree of resistance is shown in Table 4, which lists the advances under those categories. The variations here are marked, and the spread is quite wide.

Table 4. NORMANDY DAILY ADVANCES  
[In yards]

| Terrain Type | Degree of Resistance                                                                                   |                                                                                      |                                                                                      |
|--------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|              | Heavy                                                                                                  | Moderate                                                                             | Light                                                                                |
| Open         | 4100<br>1450                                                                                           |                                                                                      | 4200                                                                                 |
| Mixed        | 8000<br>3000<br>750<br>1000<br>1300<br>1100                                                            | 2000<br>1000<br>4000<br>3000<br>4400<br>2000<br>9700<br>1000<br>1000<br>3500<br>4000 | 5500<br>4000<br>6000<br>6000<br>3000<br>3000<br>2000<br>3800<br>6000<br>5000<br>3000 |
| Close        | 1750<br>300<br>2100<br>2450<br>1400<br>2500<br>900<br>700<br>3000<br>1350<br>2400<br>350<br>800<br>800 | 1250<br>3000<br>1500                                                                 | 2000<br>2500                                                                         |

## I. PERCENT OF ATTACKS WITH ADVANCES--NORMANDY-NORTHERN FRANCE

In order to determine very roughly what proportion of the attacks made in Normandy-Northern France gained ground, a hasty count was made of U.S. division attacks between 7 June and the beginning of September. Since it is simpler to think in terms of "division days" for the attack unit rather than "battles" (a term which is very difficult to define for statistical purposes when considering an action that is part of a much greater whole), what is enumerated is the number of days in which U.S. infantry divisions launched attacks against some degree of real opposition. This is to distinguish attack days from days in which divisions either were in contact with the enemy but not attacking, or were out of contact entirely. Days spent in advancing in pursuit of a fleeing enemy capable of no (or only scattered, disorganized) resistance have not been included either.

While in some circumstances an advance of 200 yards can be important (e.g., in city fighting), I have arbitrarily considered that advances of under 300 yards represented no advance.

A hasty search indicates the following totals, which include the 47 U.S. actions listed in Table 1 (71 attack days):

|                                                  |       |
|--------------------------------------------------|-------|
| Infantry division attack days showing advance    | - 331 |
| Infantry division attack days showing no advance | - 40  |

The figure of 371 days cannot be claimed as the exact total for all U.S. divisions involved. However, any margin of error should not be great. The data indicate that some 12 percent of division attack days failed to achieve a gain of 300 yards or more.

## J. ANALYSIS OF ADVANCE DATA--SIEGFRIED LINE

Fourteen of the attacks were over close terrain, 16 over mixed terrain, and 10 over open terrain. The resistance encountered by these 40 attacks may be categorized according to the descriptive terms as used in the official histories or after-action reports:

|                   |            |
|-------------------|------------|
| Heavy resistance  | - 17 cases |
| Moderate to heavy | - 4 cases  |
| Moderate          | - 3 cases  |
| Light to moderate | - 4 cases  |
| Light             | - 12 cases |

Advances ranged from a daily high of 6800 yards to a minimum of 250. The median number was 1200 yards per day. Table 5 indicates the actual gains achieved against the different categories of resistance, and Table 6 recapitulates the daily advances by the five categories.

As with the Normandy cases, the erratic nature of these advances is striking, since there are anomalies in all columns. In large part, this must be ascribed to the categorization terms as employed in the histories. As mentioned earlier, there was clearly no single standard by which units measured degree of opposition. What was moderate or even light resistance to one unit might be considered heavy to another. It was the impression as much as the reality of opposition which created the image.

Table 7 breaks down the actions on a basis of yards gained.

The following averages can be derived from the data of Table 7:

- Average daily advance for 17 attacks against heavy resistance is 919 yards.
- Average daily advance for 4 attacks against moderate-to-heavy resistance is 900 yards.
- Average daily advance for 4 attacks against moderate resistance is 1895 yards.
- Average daily advance for 3 attacks against light-to-moderate resistance is 3333 yards.
- Average daily advance for 12 attacks against light resistance is 3217 yards.
- Average daily advance for all 40 attacks is 1882 yards.

Certain anomalies are also obvious here. The average advance against light resistance is less than that against light-to-moderate. Similarly, the advance against moderate-to-heavy resistance is less than that against heavy. These differences could be the result both

Table 5. INFANTRY DIVISION ATTACKS (SIEGFRIED LINE)

| Action Number | Infantry Division | Location          | Date      | Duration (days) | Terrain Code | Degree of Resistance | Division Strength | Battle Casualties | Actual or Daily Average of Advance |
|---------------|-------------------|-------------------|-----------|-----------------|--------------|----------------------|-------------------|-------------------|------------------------------------|
| 1.            | 30th              | Geilenkirchen     | 13 Sep 44 | 1               | Mixed        | Light                | 13,952            | 44                | 5000 yds                           |
| 2.            | 30th              | Alsdorf           | 7 Oct     | 1               | Mixed        | Light                | 13,049            | 132               | 3500 yds                           |
| 3.            | 1st               | Wurselen          | 9 Oct     | 1               | Mixed        | Heavy                | 13,834            | 130               | 1000 yds                           |
| 4.            | 1st               | Verlantenheide    | 8 Oct     | 1               | Mixed        | Heavy                | 14,187            | 98                | 800 yds                            |
| 5.            | 30th              | Alsdorf           | 8 Oct     | 1               | Mixed        | Moderate-Heavy       | 12,922            | 124               | 1500 yds                           |
| 6.            | 30th              | Bardenburg        | 9 Oct     | 1               | Mixed        | Moderate             | 13,221            | 138               | 2000 yds                           |
| 7.            | 28th              | Schmidt           | 2 Nov     | 1               | Close/forest | Moderate             | 12,661            | 230               | 1500 yds                           |
| 8.            | 28th              | Schmidt           | 3 Nov     | 1               | Close/forest | Light-Moderate       | 13,833            | 252               | 5500 yds                           |
| 9.            | 28th              | Vossenach         | 10 Nov    | 1               | Close/forest | Heavy                | 13,663            | 97                | 2500 yds                           |
| 10.           | 104th             | Verlantenheide    | 16 Nov    | 1               | Mixed        | Heavy                | 14,298            | 93                | 1400 yds                           |
| 11.           | 1st               | Schneidhutte      | 17 Nov    | 1               | Close/forest | Moderate-Heavy       | 14,113            | 16                | 1000 yds                           |
| 12.           | 30th              | Wurselen          | 16 Nov    | 1               | Open         | Light                | 14,144            | 158               | 1800 yds                           |
| 13.           | 4th               | Grosshau          | 18 Nov    | 1               | Close/forest | Heavy                | 14,365            | 336               | 1000 yds                           |
| 14.           | 104th             | Eschweiler        | 19 Nov    | 1               | Mixed        | Light-Moderate       | 13,981            | 197               | 2500 yds                           |
| 15.           | 104th             | Eschweiler        | 22 Nov    | 1               | Mixed        | Light-Moderate       | 13,998            | 72                | 2000 yds                           |
| 16.           | 4th               | Weisser Weh Creek | 16-20 Nov | 5               | Close/forest | Heavy                | 14,101            | 1433              | 500 yds                            |
| 17.           | 8th               | Huertgen          | 21 Nov    | 1               | Close/forest | Heavy                | 13,978            | 38                | 500 yds                            |
| 18.           | 8th               | Huertgen          | 16 Nov    | 1               | Close/forest | Heavy                | 13,509            | 290               | 400 yds                            |
| 19.           | 4th               | Schevenhutte      | 22 Nov    | 1               | Close/forest | Moderate-Heavy       | 13,759            | 267               | 500 yds                            |
| 20.           | 4th               | Schevenhutte      | 23 Nov    | 1               | Close/forest | Heavy                | 13,884            | 322               | 600 yds                            |
| 21.           | 4th               | Wenau Forest      | 25 Nov    | 1               | Close/forest | Heavy                | 13,594            | 183               | 800 yds                            |
| 22.           | 104th             | Inden             | 28 Nov    | 1               | Close/forest | Heavy                | 14,153            | 79                | 2000 yds                           |
| 23.           | 4th               | Grosshau          | 27 Nov    | 1               | Mixed        | Heavy                | 13,859            | 213               | 800 yds                            |
| 24.           | 1st               | Schevenhutte      | 28 Nov    | 1               | Close/forest | Light                | 13,937            | 107               | 1000 yds                           |
| 25.           | 8th               | Huertgen          | 27 Nov    | 1               | Mixed        | Heavy                | 13,597            | 46                | 800 yds                            |
| 26.           | 1st               | Huertgen          | 17 Nov    | 1               | Close/forest | Moderate-Heavy       | 13,967            | 265               | 500 yds                            |
| 27.           | 8th               | Bergstein         | 3 Dec     | 1               | Mixed        | Moderate             | 12,830            | 136               | 1000 yds                           |
| 28.           | 84th              | Roer River        | 1-4 Dec   | 4               | Open         | Heavy                | 13,459            | 1001              | 625 yds                            |
| 29.           | 102nd             | Roer River        | 1-4 Dec   | 4               | Open         | Heavy                | 13,346            | 991               | 625 yds                            |
| 30.           | 104th             | Pier              | 10 Dec    | 1               | Mixed        | Heavy                | 13,356            | 115               | 2000 yds                           |
| 31.           | 83rd              | Gurzenich         | 13 Dec    | 1               | Mixed        | Moderate             | 13,017            | 337               | 3000 yds                           |
| 32.           | 78th              | Rollesbroich      | 13 Dec    | 1               | Open         | Light                | 13,668            | 63                | 2000 yds                           |
| 33.           | 2nd               | Arenberg          | 13 Dec    | 1               | Open         | Light                | 14,137            | 138               | 3000 yds                           |
| 34.           | 99th              | Arenberg          | 13 Dec    | 1               | Open         | Light                | 13,676            | 90                | 1200 yds                           |
| 35.           | 83rd              | Berzbuir          | 15 Dec    | 1               | Mixed        | Heavy                | 12,485            | 251               | 700 yds                            |
| 36.           | 82nd              | Meyerode          | 28 Jan 45 | 1               | Mixed        | Light                | 9,618             | 26                | 6000 yds                           |
| 37.           | 9th               | Rohren            | 30 Jan    | 1               | Open         | Light                | 14,144            | 43                | 5000 yds                           |
| 38.           | 2nd               | Wetzfeld          | 30 Jan    | 1               | Open         | Light                | 13,884            | 63                | 3000 yds                           |
| 39.           | 1st               | Honsfeld          | 30 Jan    | 1               | Open         | Light                | 13,863            | 73                | 4800 yds                           |
| 40.           | 2nd               | Schonseiffen      | 2 Feb     | 1               | Open         | Light                | 13,702            | 192               | 6800 yds                           |

Table 6. DAILY ADVANCES BY RESISTANCE CATEGORY  
[In yards]

| Heavy                                    | Moderate-<br>Heavy | Moderate | Light-<br>Moderate | Light |
|------------------------------------------|--------------------|----------|--------------------|-------|
| 1000                                     | 1500               | 1500     | 5500               | 500   |
| 250                                      | 1000               | 1000     | 2500               | 1800  |
| 1400                                     | 600                | 3000     | 2000               | 1000  |
| 1000                                     | 500                | 2000     |                    | 2000  |
| 500*                                     |                    |          |                    | 3000  |
| 500                                      |                    |          |                    | 1200  |
| 392                                      |                    |          |                    | 6000  |
| 600                                      |                    |          |                    | 5000  |
| 2000                                     |                    |          |                    | 3000  |
| 625                                      |                    |          |                    | 4800  |
| 625                                      |                    |          |                    | 6900  |
| 800                                      |                    |          |                    | 3500  |
| 800                                      |                    |          |                    |       |
| 800                                      |                    |          |                    |       |
| 800                                      |                    |          |                    |       |
| 2000                                     |                    |          |                    |       |
| 700                                      |                    |          |                    |       |
| *Represents a multi-day advance average. |                    |          |                    |       |

Table 7. DAILY ADVANCES IN 40 SUCCESSFUL U.S. DIVISION ATTACKS

| Yards per day | Number of Cases |   |   |   |   |   |   |   |   |    |    |    |    |    | Percentage |
|---------------|-----------------|---|---|---|---|---|---|---|---|----|----|----|----|----|------------|
|               | 1               | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |            |
| Under 1000    | .               | . | . | . | . | . | . | . | . | .  | .  | .  | .  | .  | 35         |
| 1000-1999     | .               | . | . | . | . | . | . | . | . | .  | .  | .  | .  | .  | 25         |
| 2000-2999     | .               | . | . | . | . | . | . | . | . | .  | .  | .  | .  | .  | 15         |
| 3000-3999     | .               | . | . | . | . | . | . | . | . | .  | .  | .  | .  | .  | 10         |
| 4000-4999     | .               | . | . | . | . | . | . | . | . | .  | .  | .  | .  | .  | 2.5        |
| 5000-5999     | .               | . | . | . | . | . | . | . | . | .  | .  | .  | .  | .  | 7.5        |
| 6000-6999     | .               | . | . | . | . | . | . | . | . | .  | .  | .  | .  | .  | 5          |



of the imprecision of the categorization and of the smallness of the samples for the two split categories. It will be recalled that for the analysis of attacks in Normandy-Northern France, degrees of resistance were aggregated into three simple categories of heavy, moderate, and light in order to avoid problems of this sort. As it is, only 7 of the 40 attacks are of the split-category type. And it is not clear that the attempt at further refinement really contributes much; it seems instead to obfuscate the analysis.

The relationship of degree of resistance and terrain is shown in Table 8. While there are marked variations, the spread is not as wide as in the similar table on the Normandy cases.

Table 8. SIEGFRIED-LINE DAILY ADVANCES

[In yards]

| Terrain Type | Degree of Resistance                                    |                    |                      |                |                                                              |
|--------------|---------------------------------------------------------|--------------------|----------------------|----------------|--------------------------------------------------------------|
|              | Heavy                                                   | Moderate - Heavy   | Moderate             | Light-Moderate | Light                                                        |
| Open         | 625<br>625                                              |                    |                      |                | 1800<br>2000<br>3000<br>1200<br>5000<br>3000<br>4800<br>6800 |
| Mixed        | 1000<br>800<br>1400<br>800<br>800<br>2000<br>700        | 1500               | 2000<br>1000<br>3000 | 2500<br>2000   | 5000<br>3500<br>6000                                         |
| Close        | 2500<br>1000<br>500<br>500<br>400<br>600<br>800<br>2000 | 1000<br>600<br>500 | 1500                 | 5500           | 1000                                                         |

#### K. PERCENT OF ATTACKS WITH ADVANCES--SIEGFRIED LINE

In order to make a gross determination of the ratio of successful-to-unsuccessful attacks, a rough count was made of division attack days for First Army divisions. As mentioned previously, there were fewer of these than for the comparable period in Normandy, which was the result of the terrain, the existence of the concrete fortifications of the Siegfried Line, the bad weather that Fall, and the repeated enemy counterattacks. The difference between success and failure is relative in the sort of terrain considered here, but generally an attack which was described as making only "slight" or "minor" gains was considered as no gain--and therefore unsuccessful.

Another problem lies in the definition of the term attack itself. Attacks were not all aimed at maximum advance. Often a very limited objective was chosen, especially in the forest combat. Also, division attacks in the forest were often carried out by only a small portion of the entire division.

The record shows that between 15 September and 15 December there were some 137 attack days. Of these, 17 are described in the sources as achieving either no gain or only minor gain:

|                                                  |       |
|--------------------------------------------------|-------|
| Infantry division attack days showing advance    | - 120 |
| Infantry division attack days showing no advance | - 17  |

Again, the figure of 137 cannot be considered an exact total for all U.S. divisions involved.

#### L. SUMMARY

Comparison of the two campaigns on a daily-advance basis (as shown in Table 9) provides some interesting insights on the variations to be encountered in battle:

Table 9. DAILY ADVANCES

[In yards]

| Campaign       | Degree of Resistance |                    |          |                    |       | Overall<br>Average |
|----------------|----------------------|--------------------|----------|--------------------|-------|--------------------|
|                | Heavy                | Moderate-<br>Heavy | Moderate | Light-<br>Moderate | Light |                    |
| Normandy       | 1882                 | --                 | 3023     | --                 | 3984  | 2794               |
| Siegfried Line | 919                  | 900                | 1895     | 3333               | 3217  | 1882               |

The disparity is probably due in good measure to the two-part nature of the Normandy-Northern France campaign. The first, in the bocage country, was much like the forest fighting in the Siegfried Line. However, after the breakout the action moved to more open terrain with opposition generally declining.

The proportions of the two sets of attacks meeting the different degrees of resistance are quite similar, as shown in Table 10:

Table 10. COMPARISON OF DEGREES OF RESISTANCE

| Campaign       | Degree of Resistance |                      |         |
|----------------|----------------------|----------------------|---------|
|                | Light                | (L-M--Moderate--M-H) | Heavy   |
| Normandy       | 26%(13)              | 28%(14)              | 44%(22) |
| Siegfried Line | 30%(12)              | 28%(11)              | 42%(17) |

The variations (in Tables 4 and 8) relating terrain type to degree of resistance are so marked that any average is highly questionable.

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